

The Mining Journal

Established 1835

Railway & Commercial Gazette

Vol. CCXLIV No. 6232

LONDON, JANUARY 28, 1955

PRICE 8d.



IRON ORE
STOCKING,
RECLAIMING
and
SCREENING
PLANT

designed and built by

MOXEY

BIRMINGHAM



1 R
ies



It is an axiom of Industry

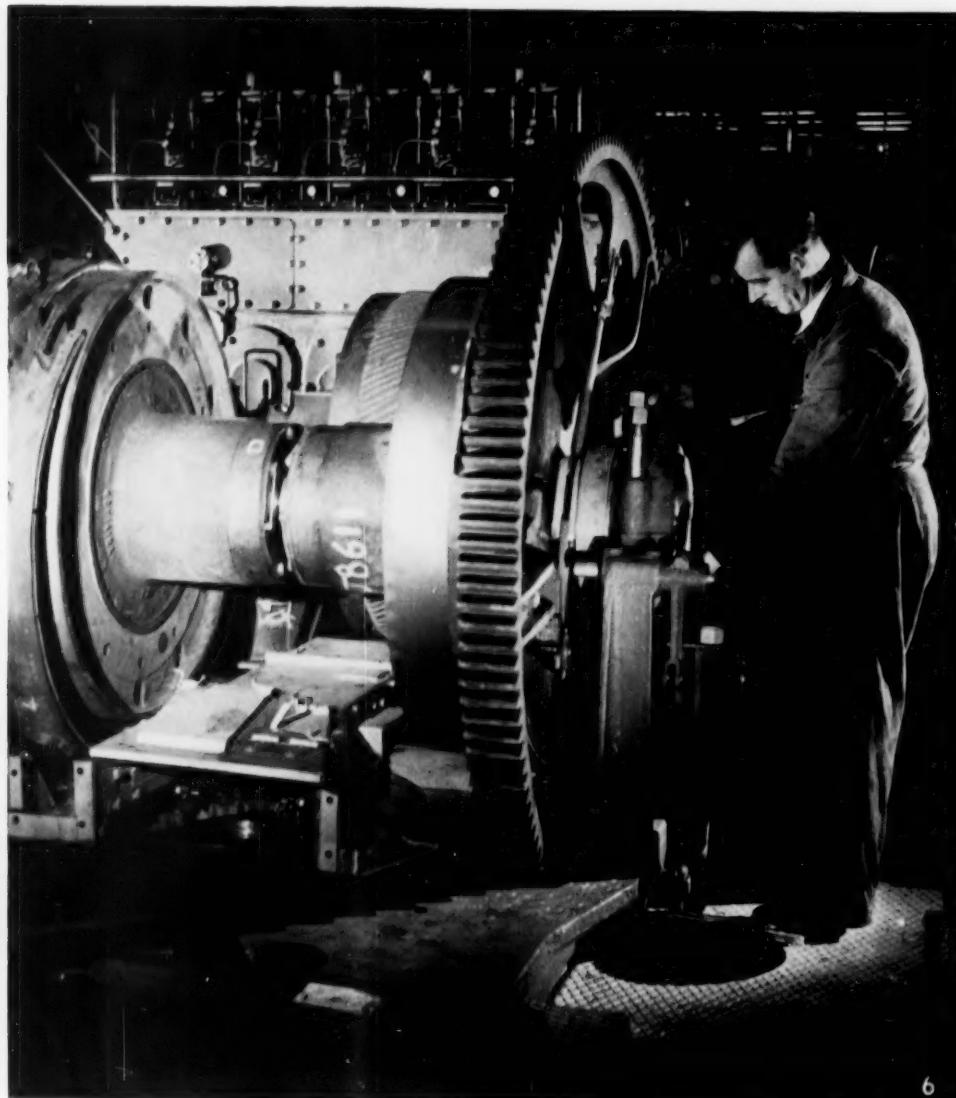
that the complexity and strength of a product are directly reflected in the organisation required to produce it.

The various engineering processes necessary to produce the R-B excavator—metal manipulation, fabrication, casting, gear cutting, machining, welding and assembly—are all keyed to the power and strength which the machine itself will need in its daily operation in the field.

To relate these processes to the important factors of cost, delivery and the operational efficiency of the excavator requires an

intricate and disciplined system of control at every stage of production. Such a system can only be built upon complete technical resources within the plant and after long and thorough experience in the industry.

But the essential fact is never lost sight of, that the purpose of every R-B 'digger' is efficient excavation in its many forms and to this end the interest of the organisation continues after production and remains, as a skilled and enthusiastic service, throughout the working life of every machine.

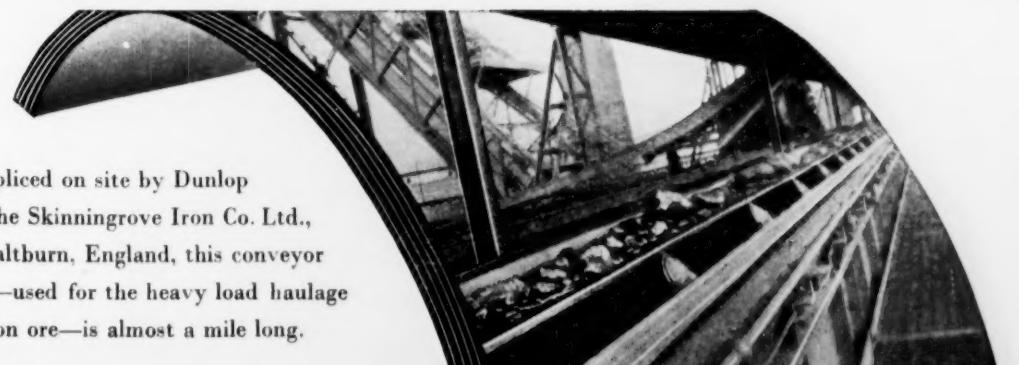


6

RUSTON-BUCYRUS LIMITED, EXCAVATOR SPECIALISTS, LINCOLN

RUSTON-BUCYRUS

- Spliced on site by Dunlop for the Skinningrove Iron Co. Ltd., of Saltburn, England, this conveyor belt—used for the heavy load haulage of iron ore—is almost a mile long.



WHATEVER

- The length of trouble-free service offered by Dunlop Conveyor Belting is equally spectacular. The belting shown here at the Belfast Corporation Gas Works in Northern Ireland has so far shifted 3½ million tons of coal and has cut renewal and maintenance costs per ton of coal at the installation to their lowest point.



THE JOB

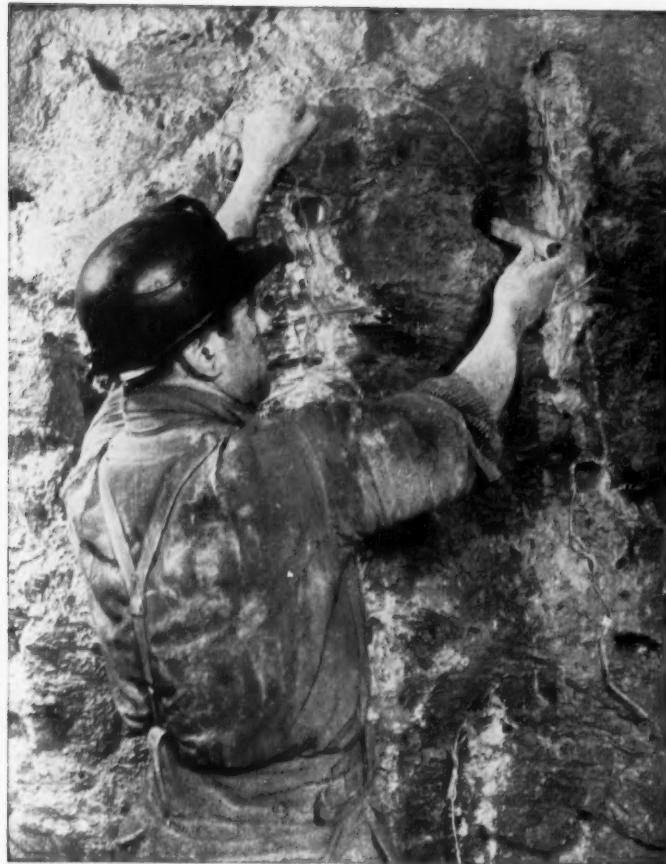
- Year after year, in the extremes of the Canadian climate, this Dunlop Conveyor Belting — 350 feet long and 3½ feet wide — gives dependable, economical and efficient service moving coal from main conveyor to stock piles. It is treated against mildew for all-weather resistance.



DUNLOP CONVEYOR BELTING
CARRIES THE LOAD

DUNLOP RUBBER CO. LTD., (BELTING DIVISION), EXPORT DEPARTMENT, CAMBRIDGE STREET, MANCHESTER, ENGLAND
Cables: Rubber, Manchester. Associated Companies and Distributors throughout the world

6000/55



'NOBEL-GLASGOW' Explosives and Accessories

There is a 'Nobel-Glasgow' explosive for every blasting operation.

Users are invited to apply to the Nobel Division of Imperial Chemical Industries Limited for assistance with their problems.

**IMPERIAL CHEMICAL INDUSTRIES LIMITED
NOBEL DIVISION, 25 BOTHWELL STREET, GLASGOW, C.2**





Whatever the job—there's a CHALLENGER to do it!

The Challenger range of British Diesel Crawler Tractors, with matched ancillary equipment, is designed to perform every possible earthmoving task. The range consists of the 50 BHP Challenger 1, the 95 BHP Challenger 3 and the 150 BHP Challenger 4.

After sales service — Wherever a Challenger is sold—no matter how remote the locality—spares and service are readily available.

More earth moved faster—by CHALLENGER



John Fowler & Co. (Leeds) Ltd., Leeds, 10

PRODUCTS OF THE MARSHALL ORGANISATION, GAINSBOROUGH, ENGLAND

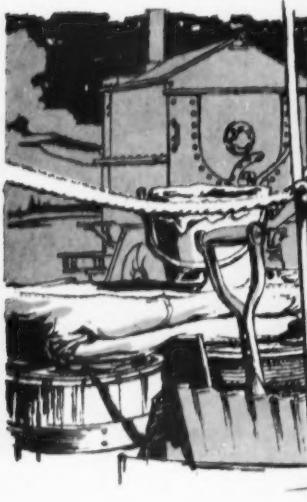
Concessionaires for Great Britain : Thos. W. Ward, Ltd., Albion Works, Sheffield, 4



Gentleman of the Road

It's his road, all his, from sunset to sunrise. But in the morning, the ring of picks and hammers and the rattle of drills rend the air. Wards are building another road.

Thos. W. Ward Ltd. are particularly well equipped for roadmaking and repair contracts. Apart from having a fully skilled subsidiary company entirely devoted to road works, other divisions of the group supply all kinds of materials and equipment used in roadmaking. Wards build all kinds of roads. Broad highways and country lanes. Aerodrome runways and factory ramps. With their integrated organization, they can bring men and materials quickly to the job, any time, anywhere.



THE TWW SERVICE ALSO INCLUDES:

Iron and Steel · Non-Ferrous Metals · Plant and Machinery · Nuts and Bolts
 Shipbreaking · Foundry Plant and Supplies · Contractors' Plant and Equipment
 Excavators and Cranes · Industrial Plant · Structural Steelwork
 Cement · Granite and Freestone · Industrial Dismantling · Rails and Sidings
 Tractors and Earth Moving Plant · Wire and Wire Products
 Packings and Jointings · Insulating Materials · Food Preparing Machinery

THOS. W. WARD LTD

ALBION WORKS - SHEFFIELD

6P/44

LONDON · GLASGOW · MANCHESTER · BIRMINGHAM · LIVERPOOL · BRISTOL · GRAYS
 WISHAW · PRESTON · CARDIFF · BRITON FERRY · MIDDLESBROUGH · MILFORD HAVEN
 INVERKEITHING · ANTWERP · PARIS · BOMBAY · CALCUTTA · SYDNEY & STOCKHOLM



A UNIQUE development

Featuring

CORE BALANCE EARTH LEAKAGE PROTECTION

in

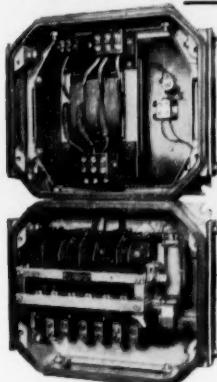
IRONCLAD ENCLOSURES

TYPE

I·D·S

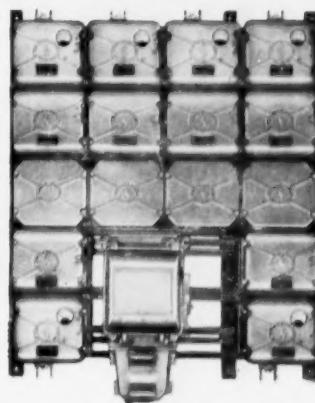


INCORPORATING AUTOMATIC CIRCUIT BREAKERS IN EACH OUTGOING WAY



A triple pole 30 amp.
Circuit Breaker with core
balance transformer and
E.L. relay.

A typical multi-way 15
amp. board with instru-
ments. Individual panel
isolators also available.



UNIQUE
UNIQUE

for its Core Balance Leakage protection.
as an Ironclad distribution with automatic protection for normal overloads and short circuits.

UNIQUE

on individual ways of power and lighting circuits with Earth Leakage protection for current ranges of up to 15 amps. and up to 30 amps. on low and medium pressure circuits.

UNIQUE

for factory circuit protection with Earth Leakage discrimination of 0.5 amps. and 0.75 amps.

UNIQUE

for application to portable and transportable equipment, for industrial use, mines and quarries, cement works, and mar shalling yard installations.

ENSURES PROTECTION TO PERSONNEL AND EQUIPMENT AS
REQUIRED BY THE MINES AND QUARRIES LAW

SIEMENS-SCHUCKERT

(GREAT BRITAIN) LIMITED

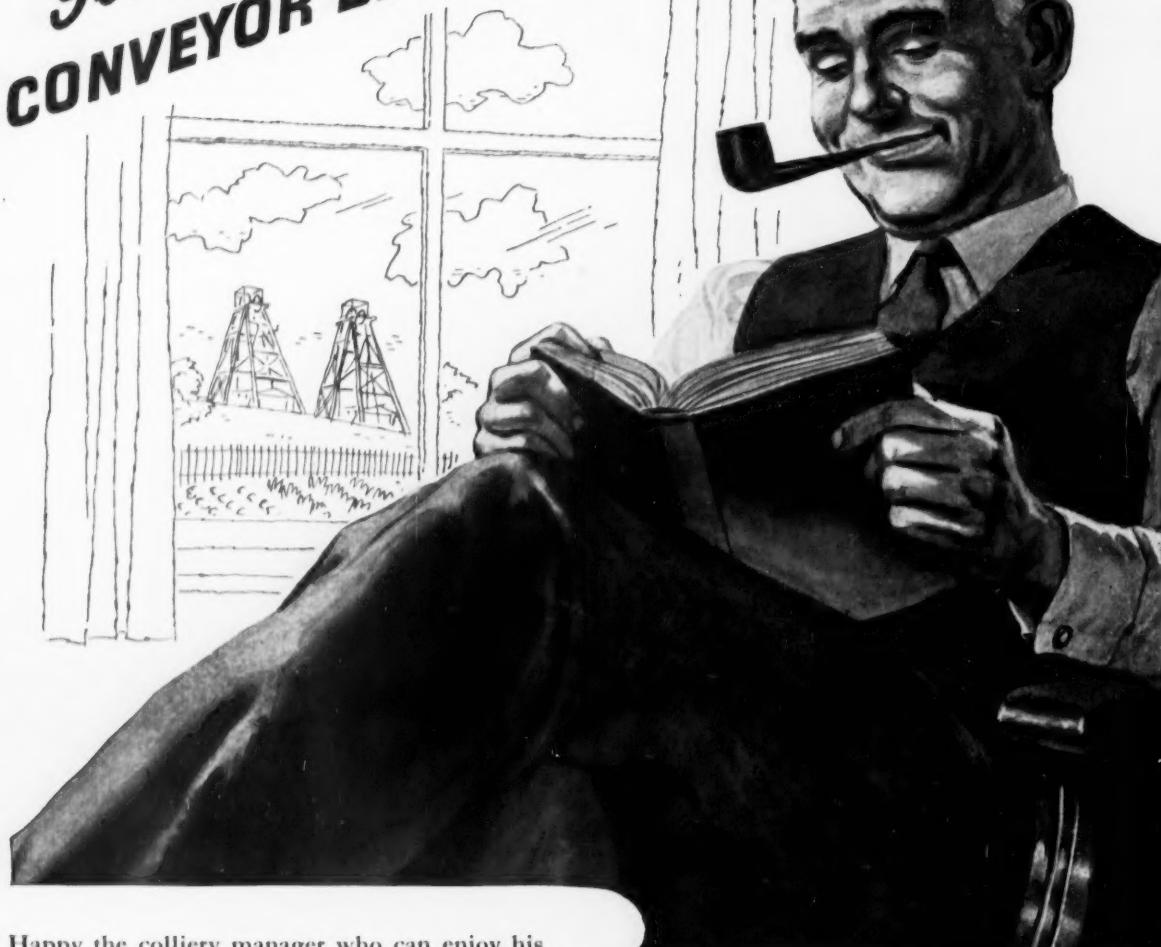
FARADAY WORKS · GREAT WEST ROAD · BRENTFORD · MIDDLESEX

Telephone: EALing 1171-6 Telegrams: Siemensdyn · Brentford · Hounslow

BIRMINGHAM: TEL: MIDLAND 2082 CARDIFF: GLASGOW: TEL CENTRAL 0171
MANCHESTER: TEL: CHORLTON 1467 NEWCASTLE: TEL: 28617 SHEFFIELD: TEL: 61564

Siemens 127

Silvertown
Flexible FIRE RESISTANT
CONVEYOR BELTING-brings peace of mind



Happy the colliery manager who can enjoy his well-earned leisure confident in the knowledge that his mine is equipped with Silvertown flexible Fire-resistant conveyor belting. For the peace of mind that comes from confidence—choose Silvertown.

National Coal Board

approval No 11

**THE INDIA RUBBER GUITA PERCHA
& TELEGRAPH WORKS, CO. LTD**
Herga House, Vincent Square, London S.W.1



D 1022



For Bucket Idlers
and Ladder Rollers
as employed in
the larger types
of Placer Dredger,
'Era' Manganese Steel,
with its
high resistance
to the wearing
and pounding
action to which
these components
are subjected,
offers great
advantages over
all other
materials.

Write for Brochure No. 509.

**BUCKET IDLERS
AND
LADDER ROLLERS**

HADFIELDS
SHEFFIELD



HADFIELDS LTD., EAST HECLA WORKS, SHEFFIELD, ENGLAND

LEARNING THE ROPES



LOCKED COIL ROPES are constructed with one or more covers of interlocking wires. Their main advantages can be summarised as follows:—

- Size for size they are of greater strength than stranded ropes.
- The smooth exterior surface gives great power to resist wear by friction.
- They are less subject to rotation and stretch than stranded ropes.
- The modern Equal Lay centre reduces internal friction.
- They can withstand a high pressure per square inch.

All ropes made by British Ropes Limited are carefully lubricated during every stage of manufacture. The interlocking wires of a Locked Coil Rope retain this lubricant with the result that the rope is much less liable to internal corrosion.

British Ropes Technical & Advisory Service is available to all rope users and we shall be pleased to advise the rope most suited to your working conditions.

Other specialised ropes made by British Ropes Limited include:- Equal Lay, Blue Strand Preformed and Flattened Strand Ropes; Braided Slings.

Locked Coil Ropes can be conveniently divided into the following groups:

- a: Ropes designed for winding, sinking and engineering purposes.
- b: Ropes designed for pit head guides and rubbing ropes.
- c: Ropes designed for aerial ropeways; Blondins and Cableways.



A typical application of Locked Coil rope

BRITISH ROPES LIMITED

Head Offices: Doncaster Tel: 4010.

Export Department: 52 High Holborn, London, W.C.I. Tel: Chancery 8822

The Mining Journal

Established 1835

Vol. CCXLIV No. 6232

LONDON, JANUARY 28, 1955

PRICE 8d.

CONTENTS

Notes and Comments	93	Reviews	101
From Our Western United States Correspondent	95	Machinery and Equipment	102
Current Mining Practice at Free State Mines of the Anglo American Corporation Group	96	Metals, Minerals and Alloys	103
Good Prospects for the Iron and Steel Industry in 1955	97	The Mining Markets	105
A Current Review of the Mineral Industry in Australia	99	Company Shorts	106
Aluminium-Coated Steel	100	Company Meetings	107
The English Electric Company in 1954	101	Westminster Bank Limited; Tanganyika Concessions Limited; Apex (Trinidad) Oilfields Limited	

Published by The Mining Journal Ltd., at 15 Wilson Street, Moorgate, London, E.C.2. MONarch 2567 Subscription £2 per annum

NOTES AND COMMENTS

Further Thoughts on the Marketing of Copper

A statement issued this week by the Rhodesian Anglo American group makes it clear that the Rhodesian Selection copper interests have failed to persuade their Rhoanglo colleagues to go along with them on the proposals for negotiating fixed price contracts with consumers, which were discussed here at some length in our issue of January 7 (page 7). Following conversations held between the two groups last week, a joint statement was issued on Tuesday of this week by Rhokana and Nchanga to the effect that both companies had decided not to depart from the L.M.E. price as their basis for sales contracts.

The reasons given for this decision may be summarized as follows: (1) Any arbitrary interference with the free interplay of supply and demand may in the long term react to the disadvantage of all concerned. (2) No price which could at present be fixed would significantly influence the competitive position of copper *vis-à-vis* aluminium and other substitutes. (3) The introduction of a fixed price scheme could have a number of unfortunate repercussions such, for example, as the creation of more than one official price in a single market. Moreover, in the absence of some pricing mechanism, such as that of the L.M.E., many difficulties arise in the fixing and subsequent periodic amendment of prices, and in the allocation of supplies. (4) The L.M.E. is felt in principle to be an effective mechanism for price determination, although improvement might be effected by the introduction of an electrolytic wirebar contract the practicability of which, the companies conclude their statement by suggesting, should be re-examined.

So far as they go, these arguments appear to us to be unexceptionable, although the statement is perhaps more notable for what it does not say than for what it does. Thus, on the first of the above points, it is to be regretted that despite the obvious importance which the statement attaches to the proper functioning of the copper market, there is no suggestion that the possibility of selling a portion of current production through the L.M.E. is receiving sympathetic consideration. As we have already pointed out here, there can be no suggestion that such action would in any way ease the immediate supply position, as at present all copper sold on the market would obviously be taken up by consumers. But later on, as and when supplies get easier, small stocks should gradually be retained in dealers' hands

and provide the beginning of stockholding by the market, which is an essential prerequisite for more stable L.M.E. prices.

Bearing in mind Mr. Simon Strauss' comments at last autumn's American Mining Congress on the necessity of cutting copper prices well below 30 c. to retain the red metal's competitive strength against substitutes, Rhoanglo are clearly right in their belief that no amount of price fixing will for the moment make copper significantly more competitive. The reason for this lies partly in the present abnormal copper shortage and partly in the fact that so much of the American copper production is very low grade that any sharp fall in price would render substantial tonnages uneconomic. Under normal free market conditions this latter factor would be of the utmost significance, but we admittedly have no means of knowing precisely the extent to which it may, during the next few years, be rendered inoperative due to the U.S. Administration's price support programme.

The third point in the Rhoanglo statement is perhaps all-important. As was made abundantly clear during the post-war period of copper control in this country, the big difficulty about price fixing is to determine the price. The controlling authority, whether a government or a group of producers, has in effect got to forecast what the free market price (had there been one) would be likely to have been over some future period. If they put the price too high, they run up a surplus, if they put it too low, they have a chronic supply shortage, if they keep chopping and changing, they might just as well not have started price-fixing.

As regards the fourth point, it is significant that our L.M.E. correspondent reports to-day on page 104 that the Committee of the Exchange is now expected to re-examine the question of an electrolytic wirebar contract in the light of the Rhoanglo statement. However, the L.M.E. can hardly be expected to try to meet the wishes of the producers in this matter without some reciprocal assurances that the latter will in future make more use of the market.

All in all, the Rhoanglo statement would appear to make it considerably less likely that other Commonwealth producers will now be successful in introducing a fixed price scheme of even limited application. Certainly if they were to proceed, other difficulties besides those mentioned above would have to be resolved. In the first place some account

would obviously have to be taken of the susceptibilities of shareholders, who can hardly be expected to have overlooked the disparity between the present L.M.E. quotation of well over £300 and the £250 basis on which price fixing proposals have been discussed. Moreover, so far as Copperbelt producers are concerned, a ticklish problem of royalty payments to the Chartered company would have to be negotiated, and it would hardly be surprising if the latter were reluctant at the present time to accept royalties on a £250 sale price basis.

When writing on this subject three weeks ago we suggested that the discussions on price fixing would in any event have served a useful purpose if they resulted in an all round reappraisal of the copper marketing process. It now appears at least possible that they have achieved even more and that, whatever the original purpose, the final outcome may yet be the fuller use of the L.M.E. facilities by the Commonwealth copper producers.

The Future Development of Britain's Coalfields

At the sixty-first annual general meeting of the Institution of Mining Engineers in London on January 27, Mr. E. H. Browne, presented an important paper giving a survey of the coalfields of the U.K. and an appreciation of their future development. The paper summarized the policy of the National Coal Board with regard to current and future development of the industry. The author spoke of the need for flexibility in long-term planning to meet the changing pattern of demand. Long-term coal demand in Great Britain is difficult to assess and any conclusions must rest on a variety of assumptions, amongst which are the level of general industrial production, the effect of competing fuels and the relationship between demand and coal prices.

The paper dealt in turn with the present position in each coalfield and the steps being taken in each area to achieve the 1965 target figure of 250,000,000 tons per annum. Periodical reviews of the position will be made and the National Plan modified accordingly. Speaking of coal reserves, Mr. Browne stated that although various estimates of probable and possible reserves have been made from 1860 onwards, it is not thought that they have contributed, or that further attempts will contribute, to an assessment of the potential production of the mining industry save in justifying the general conclusion that there is plenty of coal in the ground. He emphasized the impracticability from the point of view of a development programme of a detailed quantitative analysis of total national coal reserves although for development of individual collieries estimates of coal reserves have to be closely studied.

Yet for a general assessment of the development of the industry it is of little avail to divide broad overall estimates of total reserves by assumed annual outputs so as to arrive at forecasts in terms of life in years. The approach must be from the other end, by studying possibilities of development and aggregating potential outputs. However great the reserves of coal in total, the prospects of obtaining and maintaining a high productive level are governed by the availability of human and financial resources. The level of production hinges primarily on capacity to produce and not on total reserves.

Mr. Browne gave it as his opinion that the kernel of the problem is not total, but economic reserves. Coming as it does from the Director General of Production N.C.B. this statement makes refreshing reading as too often has the economics of state undertakings appeared to be a subordinate consideration. Under public ownership, the coal-mining industry has to carry heavy losses through not being able to reduce output. Average costs of production mask elements of inordinately high cost tonnage from "marginal"

collieries. These unfortunately cannot be closed because of the acute demand for coal. Under the National Plan not only has new capacity to be found to increase existing output but also to replace this tonnage mined at a loss.

The paper dealt with the difficulties inherent to an old extractive industry and also the possible effect of alternative fuels on national coal economy. The use of competing fuels, it was stated, will in the main be absorbed by the increased use of power and the demand for coal will be maintained. Indeed, there will be great difficulty in reaching and maintaining sufficient output to supply anticipated demand.

The paper shows the policy of the National Coal Board to be centred on the reconstruction of existing collieries rather than the sinking of new ones and during 1954 twenty-three major reconstruction schemes were approved. Five new shaft sinkings were authorized.

Mr. Browne summarized the most important areas available for development as follows. In Scotland the outstanding undeveloped reserves are in the east, extending under the Firth of Forth between the Lothians and the East Fife coalfields. At the northern end of the Central Coalfield, flanking the upper reaches of the Forth, there exists an area of some importance, though the mining of it presents difficulties.

In England, economically attractive areas lie in the concealed eastern extension of the Yorkshire and Nottinghamshire Coalfield. Appreciable areas for development in the Northumberland and Durham Coalfield exist under the North Sea. Workings from some coastal collieries ready extend 3½ miles out to sea. More data is required about these deposits and it is expected that off-shore boreholes will shortly be put down. Large reserves at depth exist under Triassic rocks between the North Staffs. and Cannock Chase Coalfields. In South Wales there are still large reserves of high quality coal, but in general, South Wales has been much worked by sporadic mining operations and although the total reserves of coal are great, mining conditions are poor.

The general tenor of Mr. Browne's paper is one of cautious optimism. However, when one considers the effect of competitive fuels on the coal-mining industry of the U.S.A. some of the author's conclusions regarding their impact on British coal economy over the next decade may well warrant revision.

B.O.M.A. Urges Tax Abatement on Overseas Operations

The time has come when a decision to abate the U.K.'s claim on overseas profits and income must be made, suggests the British Overseas Mining Association in a letter sent earlier this week to the Chancellor of the Exchequer.

The present U.K. tax system in this respect is, states the letter, anomalous in that it fails to distinguish between the overseas profits and income of United Kingdom resident companies and profits and income arising within the United Kingdom. This anomalous basis was acceptable in more "halcyon days" when U.K. tax was levied at low rates and was almost non-existent in most overseas countries, because there were advantages to be obtained from residence in the United Kingdom which was the financial and technical centre of the world. These conditions no longer exist, the Association states, and a decision on this matter is now being raised as a matter of practical politics.

If it is not possible to take the complete step of exempting such profits and income, then the Chancellor is asked to accept the principle involved by the creation of a tax differential between U.K. profits and external profits of British resident companies. On this point the Association appears to be on firm ground, as there is no doubt that the stimulus given to overseas trading by such a decision would be out of all proportion to its cost, and it would also have

the advantage of sweeping away the belief prevalent in a number of countries that the present fiscal attitude of the United Kingdom is harmful to their economies. In this connection B.O.M.A. points to President Eisenhower's recent message to Congress, in which he recommended a fourteen point differential in favour of profits earned outside the U.S.A. and expressed the view that this differential would provide a stimulus to overseas trading by U.S. residents.

These fiscal difficulties are common to all British companies trading overseas but there are problems peculiar to the British overseas mining industry on which, the Association declares, it will continue to press for relief. Thus B.O.M.A. again urges that the problem of wasting assets should be recognized by the granting of a percentage depletion allowance; that a greater elasticity be granted in the treatment of amortization and depreciation of fixed assets; and that the double taxation relief provisions be broadened to take into account overseas taxes imposed in such forms as production taxes, royalties computed on the basis of income, and export duties or royalties payable on the export of ore.

The Association's letter to the Chancellor concludes with the renewal of the plea made by Lieut. Col. J. Cross Brown, President of the Association, at its annual meeting last month (see *M.J.* December 17, 1954, page 704) that something be done about the frustration of overseas tax concessions, including tax exemption and tax deferment. This frustration, the letter says, is already causing hard feeling in certain of the overseas territories concerned.

Western United States

(From Our Own Correspondent)

Portland, Oregon, December 23, 1954.

The 84th Congress will organize in January with a Democratic majority, and there is some hope that it will assume a more helpful attitude toward the mining industry than have past Congresses. Being Democratic there is no expectation that there will be any modification of tariffs to favour the industry, but there is some reason to look for relief in the form of subsidies of one kind or another, such as Mine Incentives Bill that was introduced in the 83rd Congress but was sidetracked without action. Key committees on mining matters will be headed in both Senate and House by members who have demonstrated their favourable attitude toward mining.

The Secretary of the Interior has announced the establishment of an Office of Minerals Mobilization within the Department of the Interior, to be responsible for the maintenance of adequate supplies of certain metals and minerals to meet industrial and military requirements. The new office will be under the supervision of F. E. Wormser, Assistant Secretary of Minerals Resources.

The Office will ascertain whether the U.S. stockpiling programme for vital materials is adequate and if the programme benefits the domestic mining industry. Government agencies are stockpiling at the moment in an endeavour to bolster the sagging market for some metals, notably lead and zinc. The mining and allied industries have asserted, however, that the stockpiling programme is not a long-term solution to their problems.

THE URANIUM RUSH

Uranium still holds the centre of the stage and accounts of new discoveries, sales of properties at sensational prices, and shipments of high grade have become so commonplace as to attract little more than passing interest. For

many years the Colorado Plateau was the only known source of uranium in the United States and naturally first exploration centred there. Results have been even better than anticipated and now, with experience gained in the one locality, others give promise of becoming important centres of production.

Most noteworthy of these at present are the Marysville area in Utah, one district in north-eastern Wyoming at the edge of the Black Hills and another in west-central Wyoming on the east flank of the Wind River Mountains. The latter, known as the Gas Hills district, is very much in the limelight at present because of developments at its principal mine, the Lucky Mc. where systematic drilling by A.E.C. and the company indicate a width of orebody of from 10 to 20 ft. and U.O. content of 1 to 4½ per cent. Such ores would bring \$94.50 to \$444.50 per ton without initial production bonus or haulage allowance. Much work remains to be done on the geology of the region but the ores appear to be higher in the geologic column than those of the Colorado Plateau and there is the same argument over origin, syngenetic or epigenetic. One difference in the nature of the ores is that the uranium minerals in the Plateau region are found as coatings on the sandstone grains whereas at Gas Hills they occur between the grains, a feature which should make mechanical concentration of the ores practical.

Lucky Mc. is by no means the only operator in the Gas Hills field. Many others are carrying on successful exploration and production activities among which is Vitro Uranium Co., which operates a mill at Salt Lake City but, heretofore, has not engaged actively in mining. In order to serve this region A.E.C. is establishing an ore buying station at Riverton, Wyoming. On the Colorado Plateau Kerr-McGee Oil Industries has put its acid leaching plant into operation, making the ninth treating ores from the Plateau. Nevada's first shipment of uranium ore has been sent to the Salt Lake City plant by Uranium Mines, Inc., operating in the Austin district.

With such hectic operation as is being carried on over a large area it is natural that there should be some interesting sidelights. One is of a Colorado man who spent 18 months prospecting over six states and then made a rich strike within 20 minutes' drive of his home and about a mile from the campus of the Colorado School of Mines. Ten samples assayed by the U.S. Bureau of Mines ran from 9 to 23 per cent U.O. with an average of 16 per cent for the ten samples. Another tale is of a petrified log shipped to the Salt Lake City depot from the Gas Hills district by Green River Uranium Co. The original wood was almost wholly replaced by uranium minerals, the outer portion assaying about 50 per cent U.O. Settlement for the 4,650 lb. "log" was at the rate of \$1,200 per ton.

THE BASE METALS

All underground copper mining at the Ray Mines division of Kennecott in Arizona will be terminated in January when Number Two mine, which has been one of the mainstays of production since 1911, is closed because it has reached a depth that makes underground operations unprofitable. During its life Number Two has produced 64,000,000 tons of the 79,000,000 tons of copper ore mined at Ray. At the present rate of output it is expected to yield another 250,000 tons before the final shutdown. Henceforth all production at Ray will be by open pit.

In view of improved market conditions Sullivan Mining Co.'s electrolytic zinc plant in the Coeur d'Alene district has resumed full scale production after restricted output since last summer. Pend Oreille Mines in Washington, which has been stockpiling its zinc concentrates for the past year while awaiting a favourable turn in the market, has resumed shipments to Sullivan.

S.A. MINING TRENDS—X.

Current Mining Practice at Free State Mines of the Anglo American Corporation Group

The layout of the reduction plants of the Orange Free State mines in the Anglo American Corporation of South Africa Group are, in general, similar. But there are certain differences in the design and procedure adopted in the crusher and milling sections, and this enables the seven mines under discussion to be divided for the purpose of this article into two broad groups. The article describes these mill designs and points out the distinguishing characteristics of each, so concluding the description of current mining practice at Orange Free State mines of the Anglo American Corporation of South Africa Group which was begun in last week's issue and which described the shaft system used and the geological conditions prevailing in the Odendaalsrus Sector. The article appearing below completes the series of eight describing current mining practice in at least one mine in each of the chief South African mining groups, which were specially contributed to *The Mining Journal* by a South African correspondent.

The layout of the reduction plants of the Anglo American Free State mines is in general similar. However, there are differences in detail that classify President Brand, Welkom and Loraine together on the one hand, and Western Holdings, Free State Geduld, and President Steyn together on the other. The plants have this in common, that in the crusher sections no waste sorting or reef-picking is provided for, and that belt-washing sprays are fitted at all the head-pulleys with the wash gravitating to the crusher section rake classifiers.

CRUSHER SECTION LAYOUT

In the crusher sections of President Brand, Welkom and Loraine, the stoped ore and reef development rock pass over grizzlies (3 to 4 in. spacing) and two series of banks of double-deck vibrating screens (one bank being fitted with 2 in. and 1 in. cloth, and the other with $\frac{1}{2}$ in. and $\frac{1}{4}$ in. cloth, the latter screens being washed by sprays). The minus $\frac{1}{2}$ in. cut is directed to the rake classifiers already mentioned. The overflow from these is pumped to the secondary milling circuit and the dewatered underflow or coarse product is combined with the final crusher product (minus $\frac{1}{4}$ in.) which is stockpiled for milling.

The grizzly oversize is used as tube mill pebbles (grinding media) in the primary circuit. The plus $\frac{1}{2}$ in. cut screened from the grizzly undersize contributes a small portion (the size range is at the discretion of the operators) for use as secondary and tertiary mill pebbles, while the very much greater portion is reduced to minus $\frac{1}{4}$ in. by means of cone crushers in closed circuit with the screens.

With one difference, the layout and procedure at Western

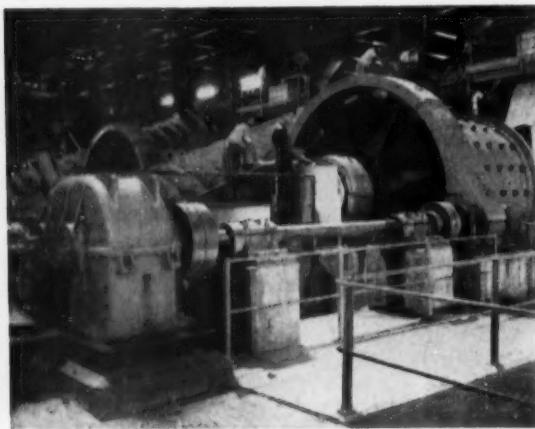
Holdings, Free State Geduld and President Steyn are similar to the crusher sections already described. This difference is that the grizzly over-size is crushed together with the plus $\frac{1}{2}$ in. screened products. The use of ball mills in the primary milling circuits makes the use of pebbles as grinding media obviously unnecessary.

All the mills incorporate or will incorporate hydrocyclone classifiers and have been designed to take full advantage of a pronounced characteristic of this type of classifier and one that is common in varying degrees to hydraulic classifiers. This is the retention in the underflow or coarse division of the major portion of the heavy mineral constituents of the ore until they have been reduced to a density-size permitting overflow with the relatively less dense gangue. In other words, the hydrocyclone classifier incorporated in milling circuits facilitates greater selective grinding of the relatively heavier mineral constituents.

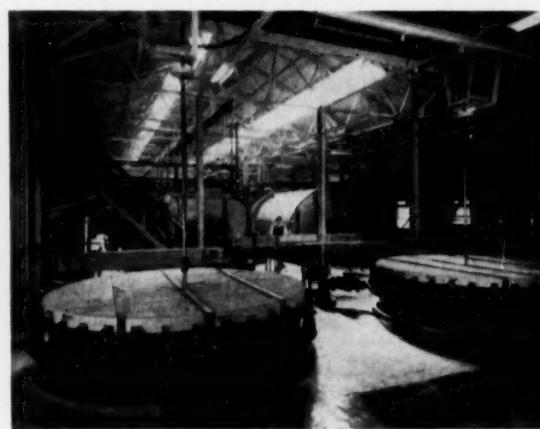
In the Free State ore, these are more finely disseminated than in most other South African gold ores. Accordingly, selective grinding with hydrocyclone classifiers in the milling circuits offers advantages for either gravity concentration or cyanidation, by reason of the greater release of the mineral constituents in themselves and from the gangue.

ANGLO AMERICAN PRACTICE

The Anglo American method of making best use of this characteristic is as follows. The overflow from the primary circuit is transferred to the secondary classifiers. The overflow from the latter is the final product from the mill, and the underflow gravitates to the secondary mills. The effluent from these is combined with that from the tertiary



Classifiers and ball mills in the Western Holdings reduction plant



Rotary and Merrill leaf vacuum filters in the President Steyn cyanide plant

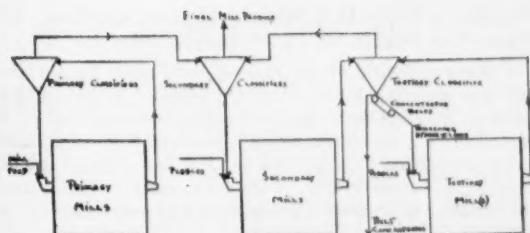
mill(s) and is classified in the tertiary closed circuit. The overflow from the latter circuit is returned to the secondary classifiers while the underflow gravitates to the mill(s) after passing over continuous counter-rotating riffle concentrator belts and through thickening classifiers. (Developed in the Anglo American group, the concentrator belt is described in the September, 1954, issue of *Optima*, Vol. 4, No. 3, a quarterly review published by the Anglo American Corporation.) These methods effect a mill recovery of gold amounting to about 45 per cent of the total yield.

DIFFERENCES IN OPERATION

In the case of the primary mills of the President Brand, Welkom and Loraine mines, large diameter holes are used in the discharge gratings to permit the release of pebbles worn to a size which in the primary mills does not effect efficient grinding. These worn pebbles are separated from the mill effluent by the discharge trommels, are transferred to and graded in the crusher section. The coarse size are used again as grinding media in the secondary and tertiary milling circuits and the finer sizes are reduced to minus $\frac{1}{4}$ in. in the crushing circuit.

The primary circuit at President Brand and Loraine consists of seven pebble mills in closed circuit with rake classifiers, which will be replaced by 12 in. 40 deg. hydrocyclones in the ratio of one to two mills, subject to adjustment. The secondary circuit comprises two 30 in. 20 deg. hydrocyclones and five pebble mills. The tertiary circuit incorporates one 24 in. 20 deg. hydrocyclone, three roughing and one final concentrator belts, a thickening 12 in. 20 deg. hydrocyclone, and one pebble mill.

The mill at Welkom consists of 12 primary pebble mills



Schematic layout of the Anglo American method

in closed circuit with six hydrocyclones, eight secondary pebble mills and three secondary hydrocyclones, two tertiary pebble mills in closed circuit with one hydrocyclone classifier and three roughing and one final riffle concentrator belts and a thickening hydrocyclone. The sizes of the hydrocyclones are the same as those in the corresponding President Brand circuits. The ratio of the primary to secondary to tertiary mills is variable at the discretion of the operators.

In the mills of Western Holdings, Free State Geduld and President Steyn, the primary circuits comprise four ball mills in closed circuit with simplex spiral classifiers. The secondary circuit consists of nine pebble mills and three 30 in. 20 deg. hydrocyclones. The tertiary circuit consists of one pebble mill, one 24 in. 20 deg. hydrocyclone, three roughing and one final riffle concentrator belts, and a thickening hydrocyclone.

In as far as other mines are concerned, the mill at South African Lands is replacing the existing classifiers by hydrocyclones. The mill at the Vaal Reefs mine will incorporate hydrocyclone classifiers.

Good Prospects for the Iron and Steel Industry in 1955

During 1954 the steel-producing countries of the world, with the notable exceptions of the United States and Canada, reported varying increased outputs with particularly impressive tonnages being recorded in the Soviet Union. The following article from our Iron and Steel correspondent describes the state of the steel industry throughout the world in 1954, and indicates the optimistic picture presented by increased demand.

With an increase of 911,000 tons or rather more than 5 per cent, British steel production last year attained its highest peak. Since total world production in the same period declined by 5.2 per cent from the 1953 record, this was justifiably hailed as a fine achievement.

But last year's records are already outdated. By November the annual rate of production in the U.K. had already passed the 19,500,000 tons target for 1955 and it is still rising. Demand for British steel—next to Australian steel the cheapest in the free world—is increasing far more rapidly than production and although the Iron & Steel Federation believe that the further planned expansion of capacity will ultimately prove adequate to cover any increase in real consumption, there has arisen an immediate shortage of supplies which has inspired a clamant demand for imports on a substantial scale. Earlier fears of redundancy have been dispelled—or at least silenced—and provision of additional capacity is being pressed forward with all possible speed.

Abroad the outstanding factor has been the American recession. According to a special world steel production survey by *Iron Age*, U.S. output in 1954 amounted to 88,300,000 tons compared with 111,600,000 tons in the pre-

vious year. There also the industry is now emerging from the trough of depression and is now operating at over 82 per cent of rated capacity.

The European Coal and Steel Community has announced an ingot output of 43,700,000 tons last year, which represents a rise of 4,000,000 tons over 1953 and is 4.6 per cent higher than the boom year of 1952.

INCREASED PRODUCTION IN EASTERN EUROPE

But the most impressive gains have been registered by the countries behind the Iron Curtain. Led by the Soviet Union, the countries in the Soviet bloc produced 7.7 per cent more steel in 1954 whereas the countries in the free world fell 9 per cent short of the record established in 1953. As a result the free world's four-to-one advantage in steel output narrowed to three-to-one, the comparative figures being free world output 182,365,000 tons, Soviet bloc 62,825,000 tons.

Apart from the U.S. the only country recording a shrinkage of production was Canada where the drop in output amounted to 24.1 per cent. On the other hand European percentage increases were, Spain 23.4, Yugoslavia 21.5, Italy 16,

Western Germany 12.4, Belgium 7.8, the Netherlands 6.5, France 6.25, Sweden 5.9, Luxembourg 4.79, the Saar 3.9.

From any consideration of long term plans for the iron and steel industry, the development schemes, projected or in hand, in British Dominions and foreign countries, cannot be excluded. The assistance of both British and Soviet interests has been enlisted to help India to raise her planned annual capacity to six million tons. A few weeks ago it was announced that a Soviet offer to build a new plant had been accepted "in principle", but latest information is that Mr. Nehru, the Prime Minister, is himself coming to London to personally intimate India's acceptance of a British offer to construct a steel plant. Mr. Kaghaven Pillai, chairman of the steel plant negotiating committee is to accompany the Prime Minister and after preliminary talks in London it is expected that a U.K. steel mission will visit India early in March with a view to the submission of tenders for two other steel plants for the Tata Corporation and the Government of India.

COMMONWEALTH EXPANSION

In Australia, which produces the cheapest steel in the world, development plans are no less spectacular. Australia's ability to export steel is virtually ruled out by high freight costs, but this country, which has been by far the biggest overseas buyer of British steel, is about to embark upon ambitious projects to meet her own requirements. The Broken Hill Proprietary is now installing at Port Kembla, near Sydney, a hot-strip mill with an ultimate capacity approaching a million tons a year, and an increase of ingot capacity by additions to the existing steel plant is envisaged. Ultimately it is expected that the total ingot capacity at Port Kembla will reach 2,500,000 tons, and other major developments in this area include a continuous pickling and sheet rolling plant for John Lysaght (Australia) Ltd., and a cold rolling mill for deep drawn sheet for the Commonwealth Rolling Mills.

Other considerable expansions are in hand in South Africa, and in the area of the European Coal and Steel Pool where German production in particular is advancing so rapidly as to be within measurable distance of overtaking the British tonnage.

CONSUMPTION ESTIMATES BRING PLANNED DEVELOPMENT IN THE U.K.

British steel interests are not unduly perturbed. Their development plan which envisages a potential ingot capacity of 21,000,000 tons in 1957-58 was based upon the most carefully calculated estimates of home and export requirements. In these there is necessarily a wide possible margin of error, but the present buoyancy of the world markets is quite pronounced and all the forecasts for the ensuing year are optimistic.

The confidence of British producers moreover, is firmly based upon improved techniques and low production costs. Because so large a proportion of the plant has been replaced by new equipment in the post-war period, British steel furnaces and mills, unit for unit, are probably the most efficient in the world. Some of the new furnaces now in operation have provided yields far in excess of designed capacity and more, much more, new plant will come into operation this year.

Provision of the increased tonnages of imported ores required to feed the blast furnaces has been greatly facilitated by the opening of the new ore field in Conakry (West Africa) and by increased shipments from Sweden and Algeria whilst transport has been made easier by the building of a number of special ore carriers and the construction in British ports of up-to-date unloading facilities and ore preparation plant.

No less decisive has been the progress made in the gradual emancipation of the steel industry from its former state of complete dependence on the nation's dwindling supplies of coal. How far this transition from coal to gas and liquid fuels has advanced is clearly illustrated by a recent statement issued by Dorman Long & Co. Ltd., the great steel colossus of the north-east coast.

From this it appears that as recently as 1946, 84 per cent of the fuel consumption consisted of producer coal. In the intervening period ingot production has increased by 43 per cent and the steel furnaces are now wholly fired by coke oven gas and liquid fuel in the proportions of 25 and 75 per cent respectively.

INCREASED EFFICIENCY THROUGH GAS AND LIQUID FUELS

The increase in efficiency which has resulted from the new methods has surpassed the highest expectations and as the Company observes, has proved necessary not only because of the higher cost of all types of fuel but is also stimulated by the possibility that suitable coal supplies may be insufficient for the country's industrial needs.

In these days of a universal shortage of skilled and semi-skilled labour, the economies in man power achieved by this industry are even more impressive. The increase in production has in fact been achieved with a small labour force. In December 1953 the total number of workers employed was 309,245 : according to the latest available statistics compiled in November last when ingot production had reached its highest peak the labour force was 289,172, a reduction of 20,073.

EXPANSION PROGRAMME

These facts fortify the belief that though keener competition may develop in the year ahead, British steel will continue to prosper, and at the outset of another year the industry is seriously considering the advisability of laying down another cold reduced sheet plant, the cost of which may run as high as £100,000,000. Undeniably there is an embarrassing shortage of sheet steel which has arisen through the swollen requirements of the motor industry. A substantial expansion programme is under way to meet the demands of this growing market. John Summers hope to raise their sheet capacity next year from 550,000 to 850,000 tons and by that time the Abbey works will have advanced from 500,000 to an annual capacity of 650,000 tons. But this will not suffice. The motor industry will have to rely on considerable imports of American sheet and unless something is done about it now the shortage in the late 'fifties may be more acute.

The steel industry cannot afford to defer a decision much longer since it would take at least three years to build a new plant of a million tons capacity. But there are many important questions to be settled. No one company has the resources to finance such a project and the selection of a suitable site is of vital importance.

VALUE OF A COMMON COUNCIL

A factor, too, which cannot be ignored is the possible intentions of the European Pool Community. The recent agreement with the U.K. which established a common council pledged to continuous consultations would appear to provide a convenient channel for the mutual exchange of views and information on this subject. In this respect the common council may fulfil a more useful purpose than was foreseen by the many who regarded with restrained enthusiasm the signature of the pact a month ago.

A Current Review of the Mineral Industry In Australia

By J. A. DUNN

Although the present seems to be a period of consolidation of the greater part of the Australian mineral industry, two clear trends emerge: namely, that a well-maintained production is supported by buoyant prices and that great exploration activity is stimulated by public interest in oil and uranium. The following article reviews the present position of Australia's mineral industry and indicates the trends which may eventuate this year. The article is an extract from Mr. Dunn's article appearing in *National Development No. 10*, published by The Department of National Development, Canberra. The author is chief mineral economist in the Bureau of Mineral Resources, Melbourne.

The position of the Australian mineral industry is to some extent in contrast with other primary industries, the agricultural and pastoral, in which export data in recent months indicate lower earnings than in the previous year. Although these lower earnings may lead to some tightening of credit and availability of investment funds in Australia generally, mining development is unlikely to be affected. At the moment, the market outlook and production possibilities of the Australian mining industry suggest further solid entrenchment for most sections of the mineral industry in 1955.

The years of high prices have been used to advantage by the basic mining companies, and the funds then accumulated have been soundly applied in expansion of capacities; the inherent strength of the stronger companies has been further increased, whilst the most marginal companies are in a better position to absorb such setbacks as may arise.

Despite some disappointments, the exploration activity should further accelerate in 1955, particularly as some prospects reach the development and production stage. Some recently developed new properties have stimulated the public attitude to speculation in prospecting. This rejuvenation of the gambling spirit in mining, with full appreciation of the financial risks, cannot fail to influence the development of the mineral industry.

THE COST STRUCTURE

With the basic wage and the extent of inflation now more or less stabilized since the end of 1953, the cost structure and future of many mines becomes clearer. Emphasis is increasingly on efficiency in method and equipment in the effort to reduce costs and strengthen the marketing position of individual producers. However, the extent to which increased margins for skill, recently granted to metal workers, will receive general application does add to the uncertainties of whether some renewed inflation will follow. Such increases cannot fail to have some impact on costs. In mining, they could adversely affect in particular the gold industry and certain mines whose welfare depends on oversea prices.

Despite the basic strength of the industry as a whole, there are some important mines whose cost position is such as to give cause for anxiety. Tariff protection has been sought in some cases, but protection of this nature, particularly of basic raw materials, is commonly not consistent with the over-all development of Australian manufacturing industry. Assistance in other forms is preferable in some cases.

The Board's reports on some of these enquiries, such as on tin and copper, did not recommend the assistance which the applicants hoped for, but most of the important producers have appreciated since that, in the event, their position is not as bad as they thought it might be. It is always of some advantage to remember that our Australian mining efficiency and costs stand in good comparison with those overseas, and that however bad the picture at any moment the overseas producers are no better off. Of

course, the case is different where an abnormally low grade domestic property must be kept in operation.

Last year was studded with events, both domestic and overseas, which have been of particular interest to the Australian mineral industry: the reopening of the London gold market; the grant of a subsidy to Australian gold producers; the Tariff Board enquiries on tin, copper, asbestos and sulphur; the U.S. Tariff Commission's report on lead and zinc and the U.S. President's decision to expand stockpiling of these commodities for the present in lieu of the recommended increased import duties; the signing of the International Tin Agreement; the opening of the Rum Jungle plant and production of uranium oxide for the first time in Australia; the decision to extend the Mica Pool for a further 5 years and to form a Committee of Management to run it; and lastly, yet one of the most important, further amendments of the Income Tax Assessment Act of benefit to the mining industry.

THE TREND IN 1955

These recent events will be reflected in the trend of the industry during 1955. During the current year, as far as can be judged at present, no important new administrative matters related to Australian mining are likely to crop up. Any new legislation affecting the mining industry is likely to be minor. Two interesting studies will be the course of tin as governed by the new International Tin Agreement, and the effect of the subsidy on gold production. Of great interest to lead producers will be any alternative action which may be taken in U.S.A. to the present stockpiling of new lead and zinc of U.S. origin to maintain price.

When final statistics for 1954 become available the total value of mineral production for the year, as recorded by the Bureau of Mineral Resources, is likely to be of the order of £155,000,000, compared with £151,800,000 in 1953. The slight increase is due mainly to improved price and greater production of lead and zinc, and to a higher output of coal. This improvement is likely to be maintained in 1955, and the total for the current year may rise to £160,000,000 consequent upon higher earnings for coal (black and brown) and some lift in total earnings of copper, tin, lead, zinc and rutile. There will, of course, be fluctuations in other products.

Total exports of the mineral industry in 1954 should be little different from the £76,900,000 recorded in 1953 by the Bureau of Mineral Resources. Higher overall exports of lead, zinc, and copper have been offset by reduced exports of gold and iron and steel. This level of exports is likely to be maintained in 1955. Mineral imports, as recorded by the Bureau seem higher in 1954 than the £95,000,000 in 1953, as imports of copper and tinplate were higher although the amount of tin imported was less. There seems to have been no great change in other commodities. In 1955 imports are likely to be below £95,000,000, as net imports of copper and primary tin may cease.

Aluminium Coated Steel

The challenge of aluminium to the older base metals is growing on many fronts. The subject of the present article is a case in point. Statistically, however, the impact of these growing uses of aluminium are, as this article suggests, less likely to result in an absolute drop in consumption of the metals it replaces than to ensure for aluminium an increasing proportion of expanding markets.

The value of aluminium as a protective coating for steel or cast iron is now widely recognized, largely because of the good results obtained with sprayed coatings. Hot-dipped aluminium coatings also have valuable properties, the most important being resistance to corrosion and heat, but commercial development has been restricted by difficulties in the method of application.

CONTINUOUS ALUMINIZING PROCESS

Up to the present the most successful process has been the continuous aluminizing of cold-reduced mild steel to produce Armco-aluminized sheet, which has been in commercial operation in the United States since 1939. Armco have now announced that a new type of aluminium-coated steel has been put into production. The basic difference between the two products is that the coating used on the first type of product consists of an aluminium-silicon alloy, while that applied to the second type is essentially pure aluminium. Although the alloy coating has proved satisfactory for heat-resisting applications, it had certain drawbacks in atmospheric service. It is claimed that these have now been eliminated.

A few years ago British technologists suggested that hundreds of uses were waiting for aluminium coated steel "if it could be produced cheaply enough". The equipment used in Armco's original process is expensive and could be used economically only for continuous operation on a fairly large scale. In 1950, the United States used only 1,000 tons of aluminium in hot-dip aluminizing, but consumption has probably reached a very much higher level in the past four years. It is improbable, however, that the aggregate consumption has yet reached a level high enough to have a significant effect on the general pattern of metal consumption. In the United States last year galvanizing took about 403,000 tons of zinc, cable covering and other coatings absorbed about 150,000 tons of lead, and nearly 33,000 tons of tin were put on steel sheet.

The new aluminized steel developed by Armco appears to be a more formidable competitor of other coating metals, notably zinc. Its cost is even reported to be less than that of galvanized steel plus one coat of paint. Advantages cited by the company include greater economy and strength than aluminium, superior resistance to fire, low coefficient of expansion, and extremely long life where there is exposure to weather conditions. Several thousand tons have already been used in outdoor applications on buildings.

RESEARCH IN BRITAIN

In Britain there has so far been no commercial production of hot dipped aluminium coatings, but this appears to be due to economic rather than technological reasons. An investigation started some years ago by the British Iron and Steel Research Association has yielded highly encouraging results. Laboratory work on sheet samples was followed by the small-scale batch aluminizing of fabricated articles, using samples up to 15 in. long. This work suggested that good results could be obtained by batch aluminizing and that the process should not be too difficult to operate. A small pilot plant suitable for the continuous aluminizing of strip up to 2 in. wide, or of wire, was therefore erected at Swansea for further investigations, the main objective being to reduce the process to the simplest form consistent

with satisfactory coating. The preliminary treatment of the strip before aluminizing has been greatly simplified and this should lead to considerable economies in commercial operation.

B.I.S.R.A. can produce coatings of satisfactory uniformity and thickness by both the batch and continuous processes, using either pure aluminium or aluminium with a silicon addition. Tests have shown that both types of coating give better protection than a zinc coating of equal thickness, and therefore of more than twice the weight. This superiority is particularly marked in humid or sulphurous conditions.

The relative costs of aluminizing and galvanizing are governed, of course, by the prices of the two metals. With the price of aluminium on a weight basis twice that of zinc, there appears to be a slight saving when metal is coated with aluminium if the coatings are of the same thickness, but aluminium permits thinner coatings to be used. A further advantage is that annealing and coating may be combined in a single operation.

LACK OF ELECTROCHEMICAL PROTECTION

The principal disadvantage of hot dip aluminized coatings is that, due to the presence of an inert, tenacious and continuous oxide film, the electrochemical protection which would be expected from such an electro-negative metal is largely lost. Hence the occurrence of uncoated spots is a more serious matter than in the case of galvanized coatings. The steel is anodic and pitting occurs. Cracks which form during deformation may also be more serious in aluminized coatings. Another drawback is brittleness of the alloy layer when pure aluminium is used in the bath. Under compression the coating fails badly, though under tension it is better than hot dipped zinc, but an improvement is effected by the presence of silicon in the bath. There are certain other disadvantages, arising mainly from the relatively high temperature of operation, such as softening of cold-worked high tensile material, and a greater tendency to warping when fabricated articles containing residual stresses are dipped.

Price considerations apart, it is probable that each type of protection will have its own distinct field of applications. While aluminium may well make some inroads on other coating metals and aluminium coated steel might even emerge as a new competitor of copper, any ground lost by zinc, lead or copper is likely to be more than offset by the development of new applications for all these metals and by the general upward trend in consumption.

The processes developed by the British Iron and Steel Research Association appear to be technically satisfactory, but their economic value can only be determined by experience with full-scale plant, which is beyond the scope of a Research Association. American interest in the latest Armco product suggests that the markets awaiting exploitation are large enough to merit very careful investigation. In view of the immensity of its corrosion problem, the mining industry alone constitutes a large potential outlet for hot dipped aluminium coatings, if they can be competitively produced, and promising fields also exist in the building, aircraft, automotive and other industries. It is reasonable to anticipate, therefore, that commercial development of the B.I.S.R.A. process will not be indefinitely delayed.

The English Electric Company in 1954

Orders from the United Kingdom and overseas countries were received by the mining division of The English Electric Company during 1954. These included orders for more winders and haulages with associated control gear, and included for operations in the United Kingdom were equipments for use by the National Coal Board. Both Ward Leonard and A.C. winders were included, the majority of the A.C. winders for equipping with D.C. dynamic braking.

During the year, eighteen winders were commissioned for U.K. and overseas service, among these being the first ground type, direct coupled, single rope, Koepe pulley winder to be installed in Great Britain. This unit has a 23 ft. dia. pulley with a 2,480 h.p. motor running at 41.5 r.p.m. A 2,180 h.p. geared A.C. drum winder has also been put into commercial use. Several partial equipments, for the modernization of existing installations, were also put in hand.

In addition to the Koepe pulley winder mentioned, other installations ordered for use in the United Kingdom included a direct coupled 1,240 h.p. Ward Leonard winder, and 1,250 h.p. and 1,920 h.p. geared A.C. winders, all fitted with manual supervisory control equipment. It is interesting to note that dynamic braking is included on all the orders for A.C. winders above 500 h.p.

During the year fifteen English Electric winders were commissioned in the United Kingdom, five of which were put into service in a period of three weeks during the conventional shut-down period in the summer.

EQUIPMENT FOR USE OVERSEAS

Included in the contracts received from abroad was a repeat order covering a winder for Siam, and the supply of additional equipment for doubling the rating of a winder in South Africa. The company also received an order from South Africa to fit dynamic braking to a 1,764 h.p. winder, not of their manufacture.

Three winders have been put into service overseas. Two others, including a 3,636 h.p. twin motor semi-automatic Ward Leonard Ilgner winder, are erected but not yet finally commissioned. One of the overseas equipments commissioned is a 1,506 h.p. geared A.C. winder in West Africa, which is the largest A.C. winder yet installed in that area.

OTHER INSTALLATIONS

Orders received during 1954 for rectifier equipments included a fourth installation, rated at 12,000 amps 325 volts, for the Nchanga Copper Refinery of the Anglo American Corporation. Steel works absorbed a considerable number of rectifiers for auxiliary services, while other rectifier equipment orders were received for shipyards, collieries and for battery-charging underground locomotives. Rectifier equipments put into service during the year included two 4,800 amp 750 volt units, for extending the capacity of an aluminium reduction plant in Norway.

A number of coal washeries for the National Coal Board have been equipped with motors, examples being Wardley and Westoe Collieries in the North Eastern Division. Considerable quantities of machines were supplied in connection with extensions to various refineries. Other orders included complete electrical installations for goldmine de-watering plant, frequency changers, excavator and drag line development, crane hoists, and wind tunnel fan drives.

During the year a large amount of hydro-electric plant was commissioned.

REVIEWS

Applied Geophysics, by A. S. Eve and D. A. Keys. Published by The Cambridge University Press. Pp. 382 including appendices, bibliography and index. Price 40s. A fourth edition.

With very few exceptions geophysical literature falls into two categories : the scientific treatise with emphasis on the physical and mathematical basis, and the book which regards exploration for oil as the only application worth discussing. One of the few exceptions is Eve and Keys *Applied Geophysics*, the fourth edition of which marks the passage of a quarter of a century since its first appearance. The occasion provides the opportunity for a brief contemplation on the field of application of geophysics in mining.

The use of geophysics in the mining industry has almost invariably had as its object the discovery of direct indications of an orebody. (One notable exception to this statement is the location of the Orange Free State goldfield.) By the standards of geophysics, this is a small-scale problem, and the scale imposes severe limitations. For this reason, perhaps, mining geophysics has remained insignificant and there are still many fields of exploration in which it is of little value. It appears to the reviewer, however, that the increasing difficulty of finding orebodies by "standard" exploratory techniques must eventually lead to a completely new approach to the problem based on study of the essential features of an orefield rather than on the features of individual orebodies. In such an approach the main use of geophysics will be to establish large-scale structures—a use far more in keeping with its fundamental nature—and geophysics will play a larger part in mining exploration than it now does.

It is, therefore, desirable that mining men should receive an appropriate measure of instruction in the principles and practise of geophysics, and Eve and Keys text-book has yet to be bettered for this purpose. Since the third edition the main advances have been airborne and radioactive methods, both of which receive due notice in the new edition. The former was not mentioned in 1938, nor could it have been ; the latter formerly received notice among "other methods," but now receives a chapter of its own. Well-logging, which was a "recent advance," also now receives extended treatment. Little if anything has been removed, so that the new edition is larger by some sixty pages than its forebear.

It is disappointing to find no reference to the development of the seismic method for shallow penetration. Admittedly this technique has found its use in civil engineering problems (especially dam-site investigation) rather than "in the search for minerals," but it has potential application in the investigation of alluvial and residual deposits. A further suggestion for the fifth edition is that more case-histories should be included, if necessary at the expense of a little pruning, e.g., of the description of obsolescent instruments such as torsion balances and gradients.—G.A.S.

Out of the Earth, The Mineral Industry of Canada, compiled by G. B. Langford. Published by University of Toronto Press. (London, Geoffrey Cumberlege.) Pp. 125. Price 28s.

Described on its flyleaf as "the direct result of a desire expressed by Canadians in many walks of life to know more about mining," the work under notice reviews the mining industry in Canada through all stages and is a book by experts for laymen. The result is a simply told yet highly effective description of a complex engineering study. The work arose from a series of talks by leaders of the Canadian mineral industry given under the auspices of the University of Toronto. A useful book to have on the shelf.

MACHINERY AND EQUIPMENT

Giant Dumpers at Opencast Coal Site

Destined to play a major role in operations at the opencast coal site worked by George Wimpey and Co. Ltd. at Maesgwyn, South Wales, is a fleet of model AFFD 34 ton Euclid Rear Dump wagons imported by Blackwood Hodge. These huge dump trucks of 20 cu. yd. struck capacity are the largest of their kind in the United Kingdom and at the Maesgwyn site are to be loaded by 6 cu. yd. shovel excavators.

Built by the Euclid Division of General Motors Corporation, the 34 ton Euclids are powered by two 200 h.p. Cummins diesel engines mounted side by side, each driving one of two rear axles through a torque converter and torquematic transmission. Despite their great size, these machines are easy to operate, as they have no clutch pedal or manual gear shifting, and in addition are fitted with power steering.

The capacities of these dumpers are 23.3 cu. yd. heap load at 3 to 1 slope, 32 cu. yd. at 1 to 1 slope and 68,000 lb. at payload weight. Each is 31 ft. 6 $\frac{1}{2}$ in. overall length, 11 ft. 5 in. overall width and 11 ft. 7 in. overall height. Turning circle diameter is 88 ft. and dumping angle 66 deg. from the horizontal. Loading height is 9 ft. 6 $\frac{1}{2}$ in. Net weight empty is 68,000 lb. and gross weight with 68,000 lb. in payload is 136,000 lb. Top speed with full payload is 28.8 m.p.h.

Two Euclid hydraulic, three stage double acting telescope hoists raise and lower the body. Oil pressure for the hoists



The AFFD 34 ton Euclid rear dump wagon

is produced by gear-type packingless pumps, and movement of the body is controlled through a fast-action fourway valve at an operating pressure for the system of 1,500 p.s.i.

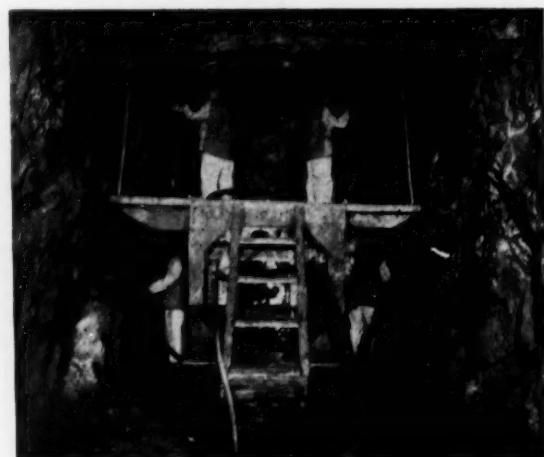
Mass Sale of Equipment

Aluminium Company of Canada has selected S and S Machinery Co. of Brooklyn, New York, to manage the sale of more than \$24,000,000 worth of construction and mining equipment used during the past several years in building Alcan's hydro-electric and aluminium smelter project at Kitimat, British Columbia. This is claimed to be the largest disposal of surplus equipment ever undertaken privately.

More than 50,000 different items purchased expressly for the project—both used and unused—are to be made available at a fraction of original costs. Mammoth shovels, tractors, cranes and dump trucks as well as small items will be sold.

Drifting by Five-Drill Carriage at Levack

To carry out high-speed drifting operations between shifts at its Levack Mine in the Sudbury district of Ontario, The International Nickel Co. of Canada is employing a specially designed drill carriage. This equipment uses five air leg drills operating simultaneously. The unit, which is operating in a main haulageway 2,650 ft. below surface, was designed and built by Inco's mines department. A feature is that the carriage folds up for convenient removal during blasting. On one occasion 28 ft. of drilling and blasting were accomplished in 24 hours.



The five drill carriage in simultaneous operation. Four drillers are visible with the fifth hidden by the carriage

The haulageway in which the drill carriage is working is 11 ft. wide 12 ft. high and 3,000 ft. long. A well organized work cycle and close timing have allowed an average of more than 300 ft. face advance per month. During one month the face was advanced more than 400 ft.

The fire cycle begins with the drilling of an average of 45 to 50 holes per round. The round is drilled off and blasted before lunch, and during lunch smoke from the blast is cleared through ventilation lines by exhaust fans. After lunch the crew members work at mucking, which includes switching and trammimg loaded cars. One man from the crew services the drill carriage during mucking operations.

The mechanical loader used in the mucking operations is the largest yet put into underground service by Inco. It dumps the muck on a conveyor belt instead of directly into the cars, permitting the use of a larger car and reducing the interruption caused by removing a loaded car and replacing it with an empty. The loader and conveyor system allow for almost continuous mucking operations. An average of 18 cars are loaded per round. The new haulage way will accommodate the 20-ton locomotives and 260 cu. ft. ore cars used at some Inco mines.



The mechanical loader in high speed drifting operation

METALS, MINERALS AND ALLOYS

COPPER.—Although the U.S. producers have so far continued to hold the 30 c. price line, consumers there appear to be showing increasing doubt regarding their continued ability to do so, and some consumers are reported to be trying to place orders for April delivery and/or to double nearby shipment purchases.

A Reuter despatch suggests that Anaconda may at the moment be the most vulnerable of the big producers. This company normally takes about 10,000 tons of Chilean blister per month for refining in the States. Following recent demands from Santiago that Chilean exports should command the world price, Anaconda apparently suspended all domestic sales early last week. Such, however, is the pressure on copper in the States at the moment that the market can clearly not afford to forego this tonnage for long and it is thought likely that to safeguard Chilean supplies, which are already being diverted to Europe, Anaconda will shortly announce a price increase of up to 3 c. arrived at by averaging Chilean copper at 36 c. with the 30 c. price for domestic copper. If Anaconda were forced to take this action, it is difficult to see the other producers holding out.

The fact that the American producers have been able to retain a nominal 30 c. level for so long is, in fact, a reflection of the high degree of vertical integration in the American copper industry, which permits in many cases of mining companies selling to associated fabricators so that the sales are little more than internal bookkeeping records and it would be surprising if some, at least, of the "loss" on these transactions were not made up on the price of the end product.

Meanwhile on this side of the Atlantic the Rhodesian Selection copper interests have apparently failed to persuade their Rhoanglo colleagues to go along with them on proposals for negotiating fixed price contracts with consumers. The matter is dealt with more fully elsewhere under "Notes and Comments" on page 93.

On the Copperbelt labour front, the events of the past week have been characterized by a stiffening in the companies' attitude towards the African strikers, who have been warned that those who are not back at work by today will be discharged. Such discharge say the companies would involve loss of past service credits in respect of leave, pension and long service benefits, and they have further made it clear that they would be selective in the matter of re-employment. It is however difficult to imagine such terms being enforced as part of an eventual strike settlement.

Anyway, it is certainly to be hoped that this sterner action will have the desired effect of accelerating the return to work. The immediate reaction of the strikers appears, however, to have been a statement from Mr. Katilungu, President of the African Mineworkers' Union, to the effect that the companies' ultimatum was the most undemocratic action the mines had yet taken, coupled with a recommendation from the council of the Union that the ultimatum should be ignored. At the same time the council has ordered that there shall be no picketing. Meanwhile as recently as last Tuesday 5,278 men were working on the mines including 2,765 on essential services.

It is doubly unfortunate that the prolonging of this strike should be leading to an exacerbation of sentiment on both sides in view of the repercussions that this will almost inevitably have on the current multilateral negotiations on African advancement. The strike itself, at any rate on the surface, is concerned purely with pay increases, and as such is unconnected with the issue of advancement, although, as *The Times* has pointed out this week, there may be reason to think that the underlying cause lies in the lack of interest displayed by the rank and file of the Union in the problem of African advancement, which, whatever the outcome, is unlikely to touch them very immediately. If this is so the present strike could be interpreted as a move by the Union to rally popular support among its lower paid members.

Meanwhile the European mineworkers have not made the problem of advancement any easier as the result of the conference they held in Salisbury last week with representatives

of South African trade unions, who have pledged their full moral, financial and other support in resisting undue inroads by Africans into European jobs. Although Mr. Stevens, president of the Northern Rhodesian Union, appears to have made an unexceptionable statement after this conference, reports suggest that the effect of the meeting has been to stiffen the attitude of the European miners on the Copperbelt towards advancement proposals, where only a week or so ago there had been encouraging signs of a more conciliatory attitude.

In the table below we give a summary of the Copper Institute's year-end production and stock figures.

	Production			Stocks		
	Dec. 1954	Jan.-Dec. 1954	Jan.-Dec. 1953	Dec. 31 1954	Nov. 30 1954	Dec. 31 1953
U.S.A.	133,523	1,311,249	1,395,003	47,108	37,094	87,712
Other countries*	108,624	1,155,028	1,120,066	181,529	179,593	280,530
World	242,147	2,466,277	2,515,069	228,637	216,687	368,242

* Excluding U.S.S.R., Japan, Australia, Norway, Sweden and Yugoslavia.

LEAD AND ZINC.—Both these metals have shown pronounced firmness in the past few days due, no doubt, in part to the position in Formosa, although with zinc the shortage of high grade metal is a more immediate consideration, which has resulted in a premium of 1½ c. for this quality over the 11½ c. basis. Latest New York reports are of active buying in anticipation of a general rise in zinc prices, and it would not be surprising to see the base price go to 12½ c. in the near future. Last week the G.S.A. issued their usual monthly invitation for offerings of domestically mined lead and zinc. The extent of these is not yet known but they may be less than in recent months in view of the possibility of stiffer prices.

TIN.—The progress towards ratification of the International Tin Agreement continues at the same dilatory pace. Copies of the ratifying bill were distributed to the deputies in the French National Assembly last week, and the bill has now been referred to the Assembly's Industrial Production Committee, which is to advise the Assembly for or against ratification. Meanwhile, the table below shows that tin production in 1954 from the six main countries seems likely to be some 3,000 tons down on 1953 despite the marked increase in Malayan and Indonesian production.

Country	Period	1954	1953
Belgian Congo	Jan.-Dec.	12,799	15,292
Bolivia*	Jan.-Nov.	26,491	32,359
Indonesia	Jan.-Dec.	35,627	33,822
Malaya	Jan.-Dec.	60,691	56,255
Nigeria	Jan.-Nov.	7,249	7,547
Thailand	Jan.-Dec.	9,775	10,126

* Exports

On the other hand the time is now drawing near when existing American buying contracts with Bolivia and the Argentine must be expected to run out, and now, as a year ago, the President's budget does not envisage the operation of the Texas smelter beyond next June, although, again, as last year, the future of the smelter is to be the subject of investigation by committees of both the Senate and the House of Representatives. However, unless the situation in the Far East deteriorates much further, there is little reason to expect a further renewal of Washington tin ore contracts, and those seeking to establish the I.T.A. must surely feel that time is running short if the transfer from American support buying to international control is to be effected smoothly.

ALUMINIUM.—Official figures issued by the American Aluminium Association show, as already forecast here, a record U.S. aluminium output for 1954 totalling 1,460,587 s.tons compared with 1,252,013 s.tons in the previous year.

Despite these remarkable statistics and the signs of expanding production in the rest of the world, a body of opinion appears to be developing in the States which fears an

aluminium shortage by next summer. Typical of such was last week's appeal to the O.D.M. by the United States Aluminium Extruders' Council to review the government position with regard to stockpiling and to reconsider its policy with regard to domestic primary production. (It will be recalled that the long-debated third-round expansion programme was finally rejected by the Administration last autumn.) The official Washington view, however, remains that there is no reason to fear an impending shortage—a fact which is reinforced by a recent announcement by the Department of Commerce that exports of domestic scrap for the first quarter of this year are to be allowed to continue under the present no-quantity-limitation arrangement.

CHROME.—Reports from Istanbul indicate a sharp decline in Turkish chrome ore shipments from Aegean ports during 1954 at 120,000 tons—less than half the total for the previous year. This is scarcely surprising news in view of the Turkish government's insistence on holding its export price well above world levels and it seems more than likely that it will be forced to reconsider its price policies.

COLUMBIUM.—According to the *Overseas Review* of Barclays Bank the Nigerian Government is expected to raise the problem of the effect of tin restriction on columbite production at the next meeting of the International Tin Committee. The difficulty of the Nigerian producers lies in the fact that if they are to restrict tin production this must in many cases result in reducing their columbite output. As far as we are aware this contingency has been foreseen in the draft I.T.A. which provides that members may donate to the stockpile any tin that they wish to produce in excess of the quota and in excess of their obligatory contribution to the buffer stock. On the winding up of the scheme they would receive these tonnages back either in metal or in cash. In the meanwhile it is of course true that they would forego any revenue from this surplus production but with columbite at its present price this may prove to be no insuperable obstacle.

QUICKSILVER.—Italian exports of quicksilver for the first eleven months of last year are reported from Rome as 2,022 tons compared with 1,706 tons in the same period of 1953.

TUNGSTEN.—It has been reported by the South Korean Government that they received 10 bids as a result of their international tungsten ore auctions—seven in New York, two in London and one in Seoul. No official statement has been issued naming the successful bidder although two New York firms, Wah Chang and Huhchang, have been variously rumoured to have been successful. Meanwhile it is understood that the government proposes to hold a further auction on February 10 at which 250 tons of ore will again be on offer. These monthly tonnages are only a fraction of the potential output from the Korean mines which at full operation are believed to be able to produce some 15,000 tons a year.

The London Metal Market

(From Our Metal Exchange Correspondent)

The market this week has been dominated by copper, the price of which has risen steadily. The main factors influencing the rise have been the realization that the strike in Rhodesia will mean less copper in the United Kingdom in March/April, the expectation that the United States domestic price will be raised, the raising of the United States export quotation, and the news from the Far East. The majority of these factors are likely to influence the market for some time, the only one which has been discounted being the possible rise in the United States domestic quotation. The demand from the Continent remains good, and although prices there tend to lag behind the London quotations a corresponding price rise is taking place.

The announcement by Rhokana Corporation and Nchanga Consolidated that they consider the difficulties connected with the introduction of a producer-stabilised quotation to be too great, was also accompanied by an acknowledgment that the Metal Exchange is in principle a suitable medium for establishing prices, but that the introduction of an electrolytic wirebar contract would in their opinion be beneficial. It is believed that the Committee will take note of this observation and will once more examine the position, although

most of the factors which existed previously in forming the opinion that only one contract was desirable still prevail.

The lead market has risen proportionately less than copper and zinc owing to fairly heavy arrivals of physical metal at the end of this month and early in February.

The zinc market has been very firm, partly in sympathy with copper and partly owing to the extreme shortage of the higher grades.

The tin market has been relatively featureless, probably owing to the occurrence of the Chinese New Year holidays during the period under review. On Thursday morning the Eastern price was equivalent to £714½ per ton c.i.f. Europe.

Closing prices and turnovers are given in the following table:—

	January 20 Buyers	20 Sellers	January 27 Buyers	27 Sellers
Tin				
Cash	£685	£686	£703	£705
Three months	£688½	£689	£706	£707
Settlement	£686	415 tons	£705	630 tons
Week's turnover				
Lead				
Current half month	£102	£102½	£103½	£104
Three months	£102½	£102½	£103½	£103½
Week's turnover	1,600 tons		3,800 tons	
Zinc				
Current half month	£85	£85½	£88½	£88½
Three months	£83½	£84	£86½	£86½
Week's turnover	2,400 tons		4,525 tons	
Copper				
Cash	£300	£302	£312½	£313
Three months	£284	£284½	£296	£296½
Settlement	£302		£313	
Week's turnover	3,850 tons		4,800 tons	

OTHER LONDON PRICES — JANUARY 27

ANTIMONY

English (99%) delivered,			
10 cwt. and over	£210	per ton
Crude (70%)	£200	per ton
Ore (60% basis)	22s./24s. nom.	per unit, e.i.f.

NICKEL

99.5% (home trade)	£519	per ton
--------------------------	---------	------	---------

OTHER METALS

Aluminium, 99.5%, £163 per ton	Osmium, £46 oz. nom.
Bismuth	Palladium, £6 15s. oz.
(min. 2 cwt. lots) 16s. lb.	Platinum, £30/£31
Cadmium (Empire), nominal	Rhodium, £43 10s. oz.
Chromium, 6s. 5d./7s. lb.	Ruthenium, £22 oz.
Cobalt, 21s. lb.	Quicksilver, £106-£109 ex-warehouse
Gold, 25s. 8d. f.o.p.	Iridium, £39 oz. nom.
Iridium, £39 oz. nom.	Magnesium, 2s. 4d. lb.
Manganese Metal (96%-98%)	Manganese Metal (96%-98%)
£225/£262	£225/£262
Osmiridium, £40 oz. nom.	Selenium, 43s. nom. per lb.
	Silver, 74½d. f.oz. spot and 74d. fd.
	Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC

Bismuth	30% 5s. 0d. lb. c.i.f.
	20% 3s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semi-friable) 48%	£12 12s. 6d. per ton c.i.f.
" Refractory 45%	£12 5s. 0d. per ton c.i.f.
" Smalls 42%	£8 17s. 6d. per ton c.i.f.
Baluchistan Metallurgical	£13 5s. per ton c.i.f.
Magnesite, ground calcined	£26-£27 d/d
Magnesite, Raw	£10-£11 d/d
Molybdenite (85% basis)	105s. 3d.-108s. 1d. per unit c.i.f.
Wolfram and Scheelite (65%)	248s.-256s. - U.K.* Govt Stock d/d 242s. 6d. plus charges
Tungsten Metal Powder	19s. nom. per lb. (home)
(98% Min. W.)	
Ferro-tungsten	16s. nom. per lb. (home)
Carbide, 4-cwt. lots	£37 6s. 3d. d/d per ton
Ferro-manganese, home	£54 15s. 0d. per ton
Manganese Ore Indian c.i.f.	
Europe (46%-48%)	66d./68d. per unit nom.
Brass Wire	2s. 11½d. per lb. basis
Brass Tubes, solid drawn	2s. 4½d. per lb. basis

* Ex-government stock for prompt delivery from January 28

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Tuesday and Wednesday saw a sharp recovery in gilt-edged. While perhaps basically this was due to good revenue returns, the immediate technical reason was a strong bear squeeze. Operators who had sold short hurried to cover themselves in rising markets probably unnecessarily in view of Thursday's ½ per cent increase in the bank rate.

Kaffirs had another poor week. Despite good returns from some individual mines, Johannesburg were unwilling buyers and there is little doubt that politics still overshadow the market.

Finance houses were generally easier although there were one or two points of resistance. Anglo American Corporation and Rand Selection both held their ground. Vereeniging Estates rose on hopes of improved industrial efficiency and the outlook for South African coal. Union Corporation were strong, thus continuing their recent trend. Profits of the mines in the group for the December quarter were all up.

Among individual Rand mines, gains over the week were more widespread. While many of the older properties lost ground, development favourites went ahead. Dominion Reefs were brought on growing uranium hopes and Doornfontein rose due to the improvement in profits, ore reserves and payability. East Rand Proprietary, although recording a fall in profits and reserves, rose on the satisfactory improvement in reef values. Hartebeestfontein were in evidence among the younger mines. Although here there was a slight falling off in values, results were still very satisfactory. Otherwise, slight rises were mainly in the Goldfields group of mines.

Orange Free State shares were still neglected. Slight falls in most issues were due to the prevailing trend rather than selling. The first results from Virginia proved disappointing and Welkom also fell. President Steyn and Orange Free State Investment Trust came under pressure but President Brand met resistance at the lower levels, on reconsideration of the excellent results announced last week.

West African, West Australia and miscellaneous gold shares

FINANCE	Price Jan. 26	+ or - on week	RAND GOLD contd.	Price Jan. 26	+ or - on week	DIAMONDS & PLATINUM	Price Jan. 26	+ or - on week	TIN (Nigerian and Miscellaneous) contd.	Price Jan. 26	+ or - on week
African & European	8/1	-	W. Rand Consolidated	46/10	-7d	Anglo American Inv.	94	-	British Petroleum	83/9	-2/9
Anglo-American Corp.	8/1	-	W. Rand Consolidated	46/6	+3d	Casta	26/9	-6d	Apex	11/-	-6d
Anglo French	8/1	-	Western Reefs	46/6	+3d	Cons. Diam. of S.W.A.	7	-	Attack	50/-	-2/9
Anglo Transvaal Consol.	28/9	-	O.F.S. GOLD	6/3	+6d	De Beers Dfd. Bearer	6/6	-	Burmah	6/6	-d
Central Mining (61 shrs.)	41/-	-	Predties	14/3	+6d	De Beers Pfd. Bearer	16/1	-	Canadian Eagle	49/9	-9d
Consolidated Goldfields	59/4	-	Freddies Consolidated	14/3	+5/-	Pots Platinum	9/6	-3d	Canadian Leasehold	34/-	+6d
Consolidated Mines Selection	49/4	-1/10d	E.S. Geduld	5/6	+6d	Waterval	15/6	-	T.P.D.	26/6	-1/1
East Rand Consols	3/9	-	Geoffries	17/3	-6d	COPPER	35/3	+7d	Trinidad Leasehold	31/9	+6d
General Mining	5/6	-	Harmony	36/-	-6d	Bancroft	110/-	+1/9	United Tin	7/1	-1d
H.E. Prop.	9/6	-	Lorraine	13/6	-1d	Chartered	5/3	-	Broken Hill South	57/-	+1/9
Johnnies	44/6	-1/3	Lydenburg Estates	23/11	-	Esperanza	7/8	-	Burma Corporation	3/3	+1/9
Rand Mines	3/1	-	Merriespruit	12/7	-3d	Messina	12/11	+2/9	Conso. Zinc	45/6XD	+3/6
Rand Selection	43/9	+7d	Middle Wits	19/3	-1/3	Nchanga	93/6	+6d	Lake George	9/9	+7d
Union Corporation	34/3	+5/-	Ostits	74/4	+7d	Rhod. Katanga	20/13	+2/9	Mount Isa	47/6	-3d
Vereeniging Estates	4/2	-	President Brand	71/10d	-2/4	Rhodesian Selection	30/9	-	New Broken Hill	39/6	-3d
Writs	40/7	-7d	President Steyn	44/4	-	Rhokana	32/4	-	North Broken Hill	71/-	-
West Wits	40/7	-7d	St. Helena	28/-	-1/3	Rio Tinto	47	-	Rhodesian Broken Hill	13/10d	+7d
RAND GOLD			Virginia Ord.	15/7	-	Roan Antelope	23/7	+7d	San Francisco Mines	24/-	+3d
Blyvoors	30/9	-6d	Welkom	27/-	-1/3	Selection Trust	73/9	+3d	Uruwira	6/1	+1d
Brakpan	7/9	+3d	Western Holdings	4/-	-1/3	Tanks	64	+5/-	MISCELLANEOUS		
Buffelsfontein	29/6	-6d	WEST AFRICAN GOLD		-	Tharsis Sulphur Br.	74	-	BASE METALS & COAL		
City Deep	13/6	-	Anamalgated Banket	2/4	-1d	TIN (Eastern)		-	Amal. Collieries of S.A.	48/6	+1/9
Consol. Main Reef	19/6	-1d	Ariston	7/1	-	Ayer Hitam	32/-	-	Associated Manganese	40/6	+1/3
Crown	44/4	-7d	Ashanti	23/3	-6d	Gopeng	7/3	-	Cape Asbestos	11/9	-
Daggas	60/7	-7d	Bibiani	4/10d	-3d	Hongkong	8/6	-	C.P. Manganese	41/9	-
Dominion Reefs	38/9	+1/3	Bremang	1/4	-1d	Ipoh	19/6	-	Consol. Murchison	55/-XD	-3/1
Doornfontein	31/3	-1/3	G.C. Main Reef	3/9	-	Kamunting	7/6	-	Nat'l Navigation	2/8	-
Durban Deep	30/-	-	Konongo	2/4	-3d	Kepone Dredging	3/6	-	Turner & Newall	111/9	+1/9
E. Champs	9/6	-3d	Lyndhurst Deep.	1/4	-	Kinta Tin Mines	10/6	-	Wankie	17/10d	-1d
E. Daggas	10/3	-3d	Marlu	1/6	-	Malayan Dredging	9/6x2	-	Witbank Colliery	4/-	-
E. Geduld (4s. units.)	27/-	-6d	Taquaah	2/9	-	Pahang	12/11	-1d	CANADIAN MINES		
E. Rand Props.	49/4	+1/10d	Western Selection	10/3	-	Pengkalan	8/10d	+3d	Dome	\$33	-
Geduld	3/6	+1d			-	Petaling	7/9	-3d	Hollinger	\$304	-
Govt. Areas	11/3	-	AUSTRALIAN GOLD		-	Rambutan	17/9	+1/3	Hudson Bay Mining	\$103/-	+14
Grootvlei	19/6	-	Gold Mines of Kalgoorlie	14/6	-	Siamese Tin	6/4	-1d	International Nickel	\$109/-	+14
Hartebeestfontein	42/9	+2/9	Great Boulder Prop.	8/3	-	Southern Kinta	18/-	-3d	Mining Corp. of Canada	6/6	+1
Libanon	9/3	-	Lake View & Star	15/6	-	S. Malayan	8/4	+3d	Noranda	\$157	-
Luijapads Vlei	22/9	-6d	Mount Morgan	19/1	-	S. Tronoh	11/6	-3d	Quemont	6/6	-
Marievale	19/6	-	North Kalgoorlie	8/-	-	Sungei Kinta	11/6	-6d	Yukon	4/7/10XD	-
New Kleinfontein	10/9	-	Sons of Gwalia	7/9	-	Tekka Taiping	6/-	-1d			
New Pioneer	15/9	-3d	Western Mining	10/3XD	-	Tronoh	8/-XR	+7d	oil		
Randfontein	67/6	-1/-			-				British Petroleum	83/9	-2/9
Robinson Deep	21/3	-	MISCELLANEOUS GOLD		-				Apex	11/-	-6d
Rose Deep	14/6	-	Cam & Motor	9/-	-				Attack	50/-	-2/9
Simmer & Jack	4/3	-	Champion Reef	4/3	-				Burmah	6/6	-
S.A. Lands	22/6	+7d	Falcon Mines	7/6	-				Canadian Eagle	49/9	-9d
Springs	3/1	-	Globe & Phoenix	24/3	-				Shell	6/6	-
Stillfontein	26/9	-3d	G. F. Rhodesian	7/-	-				Ex-Lands Nigeria	3/-	-
Sub. Nigel	38/11	+7d	Metopa	1/7	-				T.P.D.	26/6	-1/1
Vaal Reefs	34/6	-1/6	Mysore	5/1	-				Geskor Tin	31/9	-9d
Van Dyk	4/3	-	Nundydroog	6/-	-				Ultramar	26/6	-1/1
Venterspost	12/-	-3d	Oorengum	4/4	-						
Vlakfontein	18/6	+3d	St. John d'El Rey	14/-	-						
Vogelstruisbuil	35/5	-3d	Zama	47/6	-						
West Driefontein	5/4	-			-						

COMPANY SHORTS

Ariston Pays Same—Current Profits Rising.—With the recommendation of a final dividend of 20 per cent by Ariston Gold Mines (1929), the West African gold producer, total distribution for the year ended September 30, 1954, has been maintained at 30 per cent, or last year's level, on the issued ordinary capital of £1,125,000 in 2s. 6d. stock units.

Year to Sept. 30	Total Profit £	Taxation £	Net Profit £	Dividend Distributions £	%	Carry Forward £
1954	405,432	235,181	170,251*	185,625	30	78,710
1953	369,207	223,306	145,901†	182,813	30	44,084

* Excluding £50,000 transferred from general reserve.

† Excluding taxation overprovision Cr. £24,971.

Production figures in respect of the first three months of the current financial year have shown a distinct improvement over those of the corresponding previous period. Tonnage milled rose from 93,500 tons to 108,600 tons from which a total of 32,404 oz. of gold was produced as against 29,623 oz. previously. These operations yielded a profit of £150,700 as compared with £124,200. Major General W. W. Richards is chairman. Meeting, London, March 10.

Nigel Van Ryn's Increased Profits and Dividend.—Due to sharply increased profits from realization of investments at £18,164 compared with £4,647, total revenue earned by Nigel Van Ryn Reefs during the year ended September 30, 1954, advanced to £35,636 from the previous figure of £20,433. After expenses in London and Johannesburg net profit for the year was £29,943 (£13,908). Dividends on the issued ordinary capital of £169,846 in 3s. shares were accordingly increased to 8½ per cent from 5 5/9ths per cent in respect of the preceding period absorbing £7,785 (£5,190). After a transfer to general reserve of £20,000 (£5,000) the balance of unappropriated profit was £5,876 against £3,718 brought in.

Apart from its unquoted investment in Kalgoorlie Enterprise Mines, the company has a widespread investment portfolio which includes companies engaged in mining activities in South Africa, Rhodesia, East and West Africa. In addition many commercial, industrial and other shares are held. At September 30, 1954, quoted investments shown on the balance sheet stood at £193,930, with a market valuation of £266,643. Major Sir F. Entwistle is chairman. Meeting, London, March 2.

Alpine (Barberton) May Have to Close Down.—A loss of £13,416 was incurred by Alpine (Barberton) Gold Mine, the Transvaal producer, during the year ended June 30, 1954, and this compared with a loss of £4,383 previously. The chairman of the company, Mr. A. H. M. Wedderburn, stated that in the absence of an acceptable offer being received for the company's undertaking or shares it has been decided to close down operations at the end of January and put the mine on a care and maintenance basis.

Rooderand's Losses on Freddie's.—As a consequence of the formation of Freddie's Consolidated Mines and the placing of a liquidation value of 25s. on the shares of that company, Rooderand Main Reef Mines suffered a loss of £415,298. In addition, a further amount of £712,306 has been utilized to write down to either their par value, or to a nominal figure, certain investments the book value of which was higher than the market valuation as at June 30, 1954. Accordingly during the past financial year an amount of £1,047,840 had to be met by transfers from reserves and unappropriated profits. This, together with the decreased amount of £36,699 carried forward as compared with £51,661 previously lowered the company's capital and reserves to £2,037,358 as against the previous figure of £2,652,320.

Quoted investments which stood at the written down figure of £1,763,355 on the balance sheet had a valuation as at June 30, 1954 of £1,557,933. Since that date, however, there has been a considerable improvement in market values. Apart from holdings in Freddie's Consolidated Mines the portfolio also includes shares in Anglo-Transvaal Consolidated Investment, Eastern Transvaal Consolidated Mines, Middle Witwatersrand (Western Areas) and Virginia O.F.S. Gold Mining Company. Since the close of the financial year further shares have been subscribed at par in Freddie's Consolidated. Mr. S. G. Menell is chairman.

Lydenburg Doubles Revenue.—Advantage was taken by Lydenburg Estates during the year ended June 30, 1954 of improved conditions in the share market to realize certain investments which enabled the company to follow up its investment in President Brand Gold Mining Company and materially to reduce its loan indebtedness. Total profits earned rose to £42,008 as against

£20,697 previously. After expenses and taxation an amount of £32,420 (£2,931) was carried forward to the balance sheet.

With the commencement of gold production by President Steyn and President Brand Gold mining companies, Lydenburg's principal investments are now represented by producing gold mines. An interest is also held in Welkom Gold Mining Company. The company's quoted investments which stood on the balance sheet at £222,146 had a market valuation as at June 30 of £649,066. This shows a considerable rise from the previous year's figure of £404,238 due to the more realistic market valuation of Orange Free State shares since that date. Mr. A. Comar Wilson is chairman.

Frontino Maintains Revenue in First Nine Months.—It is disclosed in a report summarizing operations during the first nine months of Frontino Gold Mine's current financial year ending December 31, 1954, that the total value of metals realized was £638,102 as against £632,563 previously. Tonnage milled during this period rose to 93,823 tons as compared with 87,043 tons from which 52,667 oz. of gold (43,082 oz.), 64,773 oz. of silver (61,489 oz.) and 530,760 lb. of lead in concentrates (500,910 lb.) were produced.

Amongst the development results obtained at the Silencio Mine from a total of 11,061 ft. (11,246 ft.) during the same period some good values were recorded. On 27 level an average of 36.6 dwt. over 51 in. was disclosed from 360 ft. advanced in a drift while on 28 level a vein was followed for 170 ft. giving average values of 23.3 dwt. over 47 in. but eventually fingered out. Included in this total was a stretch of 80 ft. averaging 59.4 dwt. over 33 in. With regard to outside exploration, development work over a length of 34 ft. on a drift at the Cristales Mine disclosed an average value of 52.7 dwt. over 39 in.

Rhodesia Monteleo's Tribute Extension.—A loss of £34,509 incurred by Rhodesia Monteleo Asbestos during the year ended June 30, 1954, includes the financial disadvantage of four months' operations prior to the company's mine having been placed on a care and maintenance basis in October, 1953.

The chairman, Mr. J. Robinson, referring to the company's tribute agreement under which rights to operate on a restricted basis were granted over the Rhomonte Mine in March, 1954, reported that this agreement has now been extended until December, 1955. A small but increasing tonnage is being produced by the tributor and the reaction of end-users to the fibre is being watched with interest. Mr. Robinson also disclosed that the major portion of stocks of fibre on hand at June 30, 1953, had been disposed of and the proceeds utilized to reduce existing loan commitments. Stocks of fibre on hand at November 18 were 200 tons.

At present the outlook for this company cannot be regarded as favourable, for while no appreciable change has occurred in the demand for asbestos fibre, prices, if anything, have tended to drift lower. Mills, plant and property are, however, being maintained on a basis which would permit the resumption of operations in the event of a significant improvement in the asbestos market.

Clutha River Produces Less, Earns Less, Pays Nil.—Due to a lower volume and grade of ground treated, together with higher working costs, the revenue of New Zealand's Clutha River Gold Dredging Company earned during the year ended March 31, 1954, fell to £73,620 compared with £85,822 previously. After expenditure in New Zealand of £54,197 (£44,940), taxation of £6,762 (£18,035) and other expenses, net profit for the year was down to £2,485 as against £10,682. No dividends were paid on the company's issued ordinary capital of £200,000 in shares of 2s. as compared with 6 per cent previously.

The total amount of gold produced by the company during the past financial year was 5,957 oz. (6,719). Output during the current year to November 5 continues to show a decline and 2,896 oz. have been produced in comparison with 4,101 oz. in the corresponding period of the previous year. Col. C. E. Ponsonby is chairman.

Russo-Asiatic Maintains Investment Revenue.—The revenue earned by Russo-Asiatic Consolidated during the year ended September 30, 1954, from its holdings of Government Securities amounted to £1,138 as against £1,127 previously. After all charges, including tax, this was decreased to £302 against £326 previously. Apart from interests in Russia which again appeared in the balance sheet at a value of £2,759,620, the company's investments were shown at cost of £44,957 with a market value of £42,761. Mr. Edward P. Andreac is chairman.

WESTMINSTER BANK LIMITED

A YEAR OF EXPANSION

The Annual General Meeting of Westminster Bank Limited will be held on February 16, 1955, at the Head Office, 41 Lothbury, London, E.C.2. In the course of his statement, which has been circulated to shareholders with the Report and Accounts, the Chairman, **Lord Aldenham**, said:—

I want to thank Shareholders and Stockholders for the support which they gave to the proposals last July for alterations in our Capital structure. It is clearly desirable that the way should be made open for a gradual strengthening of our Published Capital, and a simultaneous reduction in the amount of the uncalled liability on our shares; and this has now been begun.

Our net profit shows an expansion of £148,461 compared with the previous year. This has enabled us to declare the final dividend of 2s. per share on our £4 shares, which, as a result of our Capital reorganization, are now £1 5s. paid. The increase in our dividend has taken nearly £78,000 of our additional profits, and bearing in mind the way in which British Government securities can so suddenly depreciate in value, we have deemed it advisable to make substantial allocations to our Published and Inner Reserves.

BALANCE SHEET FIGURES

The total of Current, Deposit and Other Accounts has grown by over £60 million during 1954 and at the figure of £907.9 million constitutes a record for our Bank.

Advances have risen by £47 million; in a period of greater industrial activity and production this was to be expected.

The increase of £14 million in Endorsements and Other Engagements is evidence of the growth in our foreign business, which has again been fostered by visits abroad by senior officers of our Bank; you will have gathered, from reading these remarks and our figures, that this Bank is very active in the extension of its business at home and abroad.

PROGRESS TOWARDS PEACE

In considering the events of the year 1954, the first thought in all our minds must of course be, what progress has been made towards achieving a lasting peace? We may well feel that a great step forward has been taken in the creation of a stronger and more united Western Europe; but it is difficult to believe that the Communist nations have yet come nearer to the idea of peaceful co-existence.

At home, our farmers will long remember 1954 as one of the worst years that they have had to endure.

Industrially it has been a year of good progress. The total of industrial production has again risen notably, and it is evident that we have all begun to accept again what was lately an old-fashioned idea—that in order to enjoy we must produce.

Two years of increased production have shewn us that we can thereby export more, invest more, and spend more on ourselves; though as a result of the removal of most of the restrictions on hire-purchase finance, some part of the extra goods bought in 1954 will have to be paid for out of future income.

WAGES AND SAVINGS

Wage rates have increased by some 3 or 4 per cent on the average, and rather longer hours have been worked. But it should be possible in some industries at least to search again for methods which would enable the wage earner to produce as much in shorter hours as he does at present and yet draw the same wage-packet. Dividends have also increased, and most certainly the man who saves to provide the tools of industry or the housing of the nation is worthy of his hire.

There has been a good increase in small savings, and the total of personal savings of all kinds again increased during 1954. During the year also the index of retail prices remained relatively stable. These two facts must surely be interrelated. It is certain that people are more inclined to save when it looks as if savings will retain their purchasing power. There are some people who think we ought to reconcile ourselves to a permanent condition of gradually rising prices. What this seems to me to amount to is that wage earners and profit earners would constantly be increasing their slice of the cake at the expense of pensioners, of other persons with fixed incomes, and of future savers. A rise in Bank Rate would seem to me much less undesirable than inflation.

We cannot rely on much further increase in the number of workers, and there is clearly a need to improve machinery and technique to enable the same labour force to produce more goods. It is therefore most cheering to read not only

of the vast new development projects of the motor industry, but also of the increase in the number of applications for location permits for new factories.

Increased industrial investment will need new savings, and it is greatly to be hoped that the next Budget may give more encouragement to those companies and individuals who do make the effort to save.

In spite of the abolition of many war-time controls, it is not possible to record any great drop in the number engaged in National and Local Government service. With productive industry clamouring for more men and women it is to be hoped that a check will be put on recruitment for Government and Local Government services.

Industrial disputes have unfortunately wasted even more of the nation's working time than in 1953. When a dispute interrupts the flow of exports, as any important stoppage nearly always does, the dislocation of trade may last for several months, and if our overseas competitors take the opportunity to step in, some of the damage may be permanent.

The mounting figures of capital investment in the coal industry, together with the assurances of increased output which the National Coal Board and the miners' leaders gave in January, 1954, led the nation to hope for a substantial increase in coal production, a hope that has not been fulfilled. We are still obliged to import coal from America—a most regrettable position.

EXTERNAL AFFAIRS

Taking the year 1954 as a whole we fared well in our external affairs. In the first half of the year we had a surplus on our current transactions with other countries amounting to £154 million, not counting defence aid, and we should shew a substantial surplus for the full year. A surplus would not be a great cause for satisfaction if it had been obtained by a serious running-down of stocks of goods, or if it were the result of a lucky and temporary fall in the prices of our imports compared with those of our exports; but neither of these things happened in 1954.

The gold and dollar reserve, which stood at just below £900 million at the end of 1953, had increased to £986 million by the end of 1954; and this was after making three big gold payments during the year. Direct dollar aid and off-shore purchases, that is, purchases of British armaments by the United States to supply other free nations, have helped us; without this help our reserves would hardly have been maintained.

For the last six months of 1953 there was a considerable decline in industrial production in the United States and Canada, and this was reflected by a contraction of our trade with North America. It must be remembered, however, that the fall in industrial production in the United States never brought the index figure down to the level of 1952, and industrial production is now well on the way up again. It is to be hoped that our ability to weather this comparatively slight American recession will not lead us into easy optimism as to the consequences for us of any future recession there.

The activity of trade in Europe has been a great advantage to the United Kingdom and the sterling area. It is satisfactory to note that we have started to pay off our old indebtedness to the European Payments Union. The Union has served its purpose well. It has enabled its members to make the most of their scarce reserves, and the credit it has granted has helped to tide some of them over difficult times.

The hope of convertibility of the pound sterling received a set-back during 1954 when the United States Government decided to defer consideration of the recommendations of the Randall Commission for some liberalization of trade; but the President's recent message to Congress makes it probable that the question will be reconsidered at an early date.

PROSPECTS FOR 1955

In considering our prospects for 1955, we should be unwise to ignore some warning signs. Whilst the up-turn of business activity in the United States offers the hope of a re-expansion of our trade with North America, we cannot feel the same confidence about our trade with some sterling countries. Some of our best customers—Australia, India and New Zealand—are shewing signs of anxiety at the present trend of their overseas payments and may wish to curtail their imports during the coming year. Our exporters are doubtless taking note of this position and know that they may have to redouble their efforts to expand trade in other directions.

If, then, we can look back at our progress in 1954 with a feeling of considerable satisfaction, we ought to recall that it is not long since the economic situation of our country was rightly described as precarious. It would be less than honest to suggest that we can yet afford to forget that word.

TANGANYIKA CONCESSIONS LIMITED

SIR ULLICK ALEXANDER'S REVIEW

The Annual General Meeting of Tanganyika Concessions Limited was held on January 20, 1955, at the Head Office of the Company, 1, New Africa House, Union Avenue, Salisbury, Southern Rhodesia, the Right Honourable Sir Ullick Alexander, G.C.B., G.C.V.O., C.M.G., O.B.E., the Chairman, presiding.

The following is an extract from his circulated Review:—

"From the Accounts you will observe that the profit after taxation amounted to £2,519,282. This profit is higher than last year, which, at £2,057,914 was a record, and your Directors have been pleased to propose the payment of a final dividend of 45 per cent on the Ordinary Stock which, if approved, will make a total dividend of 55 per cent for the year."

"The increased profit is again due to the prosperity of the Union Miniere du Haut-Katanga, which increased its total net dividend from Belgian Francs 1,250 for the year 1952, to Belgian Francs 1,450 for the year 1953."

Addressing the Meeting the Chairman said that in dealing with the Benguela Railway in his Review published with the Annual Report and Accounts he referred to the continued necessity to finance expansion of the Railway to meet increasing demands for traffic, and he expressed the hope that he would be in a position to announce at the Annual General Meeting new arrangements for dealing with this problem. He was now glad to state that arrangements were being made for the Benguela Railway to raise an additional £2,025,000 of capital by the issue of the remaining £2,250,000 of the £4,000,000 5% Debentures already authorized. This would provide the Railway Company with funds to complete the remainder of the 1954/55 programme and a new programme of capital expenditure to be incurred during the years 1955/57. The Board considered that this capital expenditure was required to ensure the maximum efficiency from the existing assets and at the same time to meet the rapid and encouragingly steady development of traffic, both internal and external, on the Railway. It was expected that the capacity of the line for export through traffic would thus be substantially increased.

The Debentures would be subscribed by their Company at a discount of 10%, and the funds for the purchase would be provided by the issue by their Company of £2,000,000 of 4½% Unsecured Loan Stock 1965/75. He said he was happy to inform the Stockholders that Hambros Bank Limited and Morgan Grenfell & Company Limited, through Messrs. Rowe & Pitman, and the Company's brokers, Messrs. Greener Dreyfus & Company, had placed this Loan Stock at 99% privately with various institutions in the United Kingdom with whom they were in the habit of doing business. The Stock was redeemable by 20 annual redemption instalments of £100,000 each starting in 1955 with the right to redeem the whole but not part of the outstanding stock after 10 years at varying premiums.

This increase of the traffic capacity was necessary so that the Railway Company, while meeting as it had always done, all traffic demands from the Belgian Congo, might be in a position to meet the increasing demands, both inward and outward, which were arising as a result of the progressive development of Central Africa. Stockholders would be aware that the traffic at present carried by the Benguela Railway Company consisted principally of minerals from the Belgian Congo to the Coast. During 1954 a considerable tonnage of coal was carried from Lobito to the Belgian Congo and to Northern Rhodesia, and he thought it was fair to say that the assistance so afforded to the copper producers in the latter area had been of very considerable importance. When this improvement of the line was completed the Lobito Route should be in a position to play a full part in the future development of the Central African territories.

The Chairman expressed thanks to the Company's staff for their untiring services during the year.

The Report and Accounts were adopted, the payment of the Final Dividend was approved, and the retiring Directors were re-elected.

MINING ENGINEER. B.Sc. Rand, Union of South Africa Mine Manager's Certificate, Associate Transvaal Mine Manager's Association, etc., 45, seeks responsible position. Married—long experience underground manager, chief of study, ventilation, Union and Rhodesia, especially hot, deep mines: incline and vertical shaft sinking. Reply, Box 562, The Mining Journal Ltd., 15 Wilson Street, Moorgate, London, E.C.2.

APEX (TRINIDAD) OILFIELDS LTD.

The annual general meeting of the Company was held at Winchester House, London, E.C.2, on January 20, 1955. Mr. Malcolm MacLachlan (Chairman of the Company) presided.

The Chairman, in submitting the accounts for the year ended September 30, 1954, said that net oil revenue amounted to £1,399,000, and the net profit to £631,000. A final dividend of 1s. 3d. free of income tax was recommended, making 1s. 6d. free of income tax.

Production amounted to 3,007,000 barrels of crude oil and 4,085,000 gallons of casinghead gasoline. During the year 97,204 ft. were drilled. Eight wells were completed in the Main Field and five in the South Quarry area. One of the South Quarry wells was drilled to a depth of 10,400 ft. with the Herrera sands of the Oligocene formation as its objective. The sands were found at about 9,300 ft., but were water bearing with the exception of the top section which was yielding some small oil production. In the Synclinal area three wells were completed to normal depths of which one was unproductive and two were very satisfactory producers. A fourth well was drilled with the Herrera sands of the Penal Oligocene structure as its objective. This well was drilled to a depth of 16,115 ft. thereby beating by some 1,200 ft. the record which the Company had set up in 1953 of the deepest well drilled in the British Commonwealth. Well developed Herrera sands were found at approximately 11,600 ft., but proved to be water bearing. The well was finally brought in in the Cruse sand at about 7,300 ft. with moderate oil production. A further deep well would shortly be programmed. Seismic surveys by contract parties were nearing completion over an area of some 14,000 acres about twelve miles to the south-west of the Company's producing fields and results should shortly be available for study. Cost of the Company's deep drilling had been extremely high and it was satisfactory that the Company had been able to build up a strong financial position. Oil operations in Trinidad were carried on under outstandingly difficult geological conditions, the daily output of oil per well was small and there was need to develop new oil reserves.

The report was adopted.

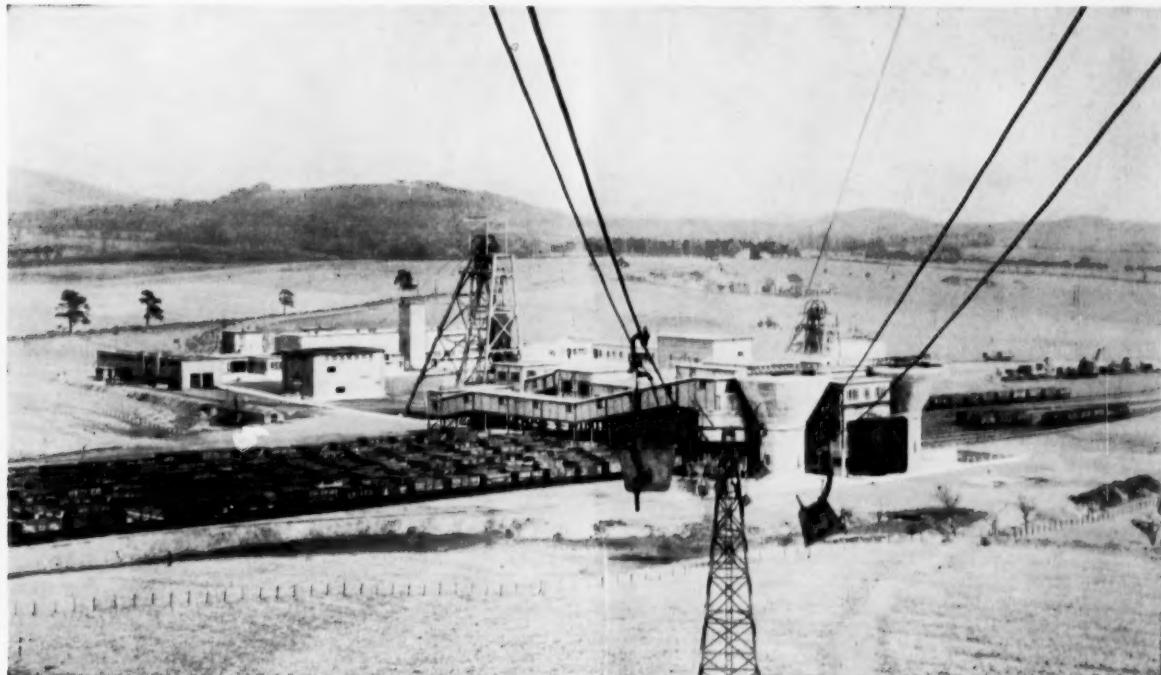
METALLURGIST (MINERAL DRESSING)

An ASSISTANT METALLURGIST required by Tin Mining Company operating in South Thailand (Siam). Graduate of University or School of Mines preferred; previous experience desirable but not essential. Salary according to qualifications and experience but in any case not less than £1,000 per annum. Contract Agreement and free passages both ways with paid leave on completion of contract. Staff Provident Fund in operation. Apply in first instance with copies only of references to Box 564, The Mining Journal Ltd., 15, Wilson Street, London, E.C.2.

TECHNICAL MINING ASSISTANT required by Copper Mining Company in India. Applicant should hold a recognized mining degree and be single. Salary starts at £600 p.a. with cost-of-living and servant allowances of £141 p.a. In addition an annual bonus is paid, and a Provident Fund is in operation. Three years' contract, with leave on full pay after 2½ years in India. Free furnished accommodation with fuel and light. Apply giving full particulars to Box 430, Walter Skinner Ltd., 20 Copthall Avenue, London, E.C.2.

METALLURGICAL ASSISTANT required by Copper Mining Company in India. Applicant should hold a recognized metallurgical degree and be single. Salary starts at £675 p.a. rising to £725 in the third year, with cost-of-living and servant allowances of £141 p.a. In addition an annual bonus is paid and a Provident Fund is in operation. Three years' contract, with leave on full pay after 2½ years in India. Free furnished accommodation with fuel and light. Apply giving full particulars to Box 433, Walter Skinner Ltd., 20 Copthall Avenue, London, E.C.2.

When time can be measured in coal— Tecalemit Lubrication is a Must!



Comrie Colliery, Fifehire

Highly modernised collieries have replaced manual labour with machines wherever possible, both above and below ground. But the engineers have taken mechanisation a step further. They've made sure the machinery is more efficiently serviced by letting it take care of itself—with Tecalemit *Automatic Lubrication*.

PRECISION LUBRICATION

Tecalemit Lubricating Systems feed the correct amount of oil or grease to every bearing at intervals pre-set to meet the machine's requirements. Besides cutting labour costs, hold-ups in production are slashed because the machine is maintained *as it works*.

BREAKDOWNS REDUCED, TOO

Manual Lubrication is seldom efficient, even under supervision—particularly where conditions may be

difficult. Many breakdowns are caused through inadequate or irregular lubrication. Tecalemit Automatic Systems eliminate this danger and increase production even more by keeping machines at top performance.

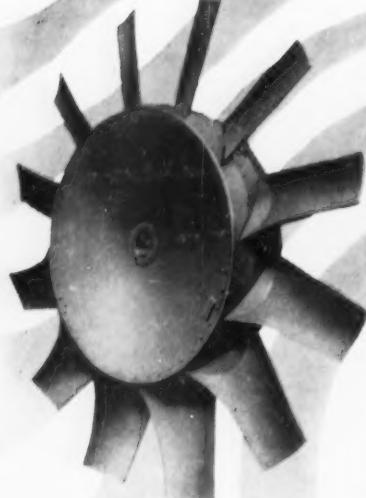
AUTOMATIC LUBRICATION IS SO EASILY INSTALLED

All Tecalemit Systems are designed for speedy, easy installation. Ask for a Tecalemit representative to call with full technical information.

TECALEMIT AUTOMATIC LUBRICATION PAYS FOR ITSELF IN PRODUCTION

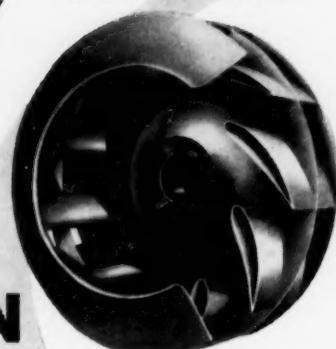
Tecalemit Limited • Plymouth • England

AXIAL FLOW ROTOR

ADJUSTABLE PITCH
AEROFOIL BLADES**Aerex**

HIGH EFFICIENCY FANS for MINE VENTILATION

RADIAL FLOW IMPELLER

BACKWARD INCLINED
AEROFOIL BLADES**AEREX LTD., 220/238 WEST STREET, SHEFFIELD 1, ENGLAND**

London and Export Office: 6/7 NEW BRIDGE STREET, LONDON, E.C.4.

Also Manchester, Glasgow and Stockton

OVERSEAS—

AUSTRALIA : AEREX (AUSTRALIA) COY,
DOWLING ST., WATERLOO, SYDNEY, N.S.W.CANADA: CANADIAN VICKERS LTD.,
P.O. Box 550, MONTREAL, P.Q.SOUTH AFRICA : AEREX LTD.,
P.O. Box 5827, JOHANNESBURG.

Telephone: Sheffield 28441

Telephone: City 8341

WOLVERHAMPTON DIAMOND DIE & TOOL Co. Ltd.

BOARTS
and
INDUSTRIAL
DIAMONDS
Exporters

11 HATTON GARDEN,
LONDON, E.C.1.

Telephone: HOLborn 3017 Cables: Pardimon, London

WIGGLESWORTHS for POWER TRANSMISSION EQUIPMENT



Makers of
“TEXROPE”
V
DRIVES

*PROVED
BEST
BY
TEST*

FRANK WIGGLESWORTH & CO. LTD.
ENGINEERS
SHIPLEY YORKSHIRE

**For FLEXIBILITY
efficiency and
continuous service**

Denver "Sub-A" Flotation Machines are in universal use because they are adaptable to all kinds of flotation problems and possess the correct fundamental principles for high recovery. Important features include the following:

- Flexibility in feed and direction of flow.
- Pulp level control of each individual cell.
- Ability to handle coarse material thus reducing grinding costs & preventing slime.
- Easily controlled aeration—suppressed — standard or supercharged.
- Rugged simplicity of construction for long service.
- Replacement parts readily available.

Cost per ton of ore processed, compared to any other means of mineral recovery, has established Denver "Sub-A" as the standard flotation machine the world over. Over 34,000 are now in use. Write for Bulletin No. F10/B.50.

DENVER

"Sub-A" FLOTATION

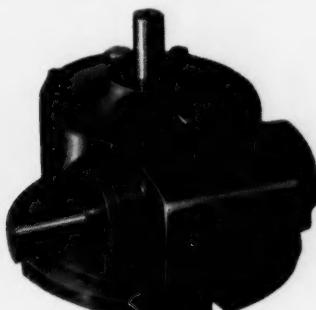


DENVER EQUIPMENT CO. LTD.
15-17 CHRISTOPHER STREET · FINSBURY SQUARE · LONDON E.C.2.

Telephone: BISHOPSGATE 3575 Cables: 'DECOLON' London

DENVER NEW YORK CHICAGO EL PASO VANCOUVER TORONTO MEXICO CITY LONDON JOHANNESBURG RICHMOND

TIB 64A



New

WORM REDUCTION GEARBOXES

SINGLE AND DOUBLE REDUCTION

Vertical and Horizontal Drive

Ratios covered in range 5 : 1 to 10,000 : 1

★ Types are available for early Delivery.

S.E. OPPERMANN LTD.
STIRLING CORNER (A1. ROUTE), BOREHAM WOOD,
HERTS., ENGLAND. Phone: ELSTREE 2021.

LATEST DESIGNS

Embodying the
most Modern Engineering
Practice & Process

Call, write or phone for our catalogue
of Gearboxes and Geared Motors.

Bank of British West Africa Limited

Established 1894



AUTHORISED CAPITAL - £4,000,000
SUBSCRIBED CAPITAL - £3,000,000

PAID UP CAPITAL - - - £1,200,000
RESERVE FUND - - - £1,200,000

BANKERS TO THE GOVERNMENTS OF THE GAMBIA, SIERRA LEONE, GOLD COAST AND NIGERIA
The Rt. Hon. LORD HARLECH, K.G., G.C.M.G., Chairman

* Head Office:
37 GRACECHURCH STREET, LONDON, E.C.3

General Manager: F. G. WRIGHT

LIVERPOOL
25 Water Street

MANCHESTER
106-108 Portland Street

Secretary: E. J. D. KEWLEY

HAMBURG
Schauenburgerstr. 49

GAMBIA - - -	Bathurst
SIERRA LEONE - - -	Freetown
	Bo
GOLD COAST AND ASHANTI, AND B.M.T.	Accra (High Street)
	Sekondi
	Sunyani
	Accra (Tudu)
	Swedru
	Berekum
	Takoradi—
	Cape Coast
	(Harbour)
	Dunkwa
	Hohoe
	Keta
	Kotoredua
	Tarkwa
	Kumasi
	Tema
	Oda
CAMEROONS - - -	Duala
	Winneba

NIGERIA -

Aba	Kano— (Fagge Ta Kudu)
Abeokuta	Lagos—(Marina)
Apapa	Lagos—(Broad St.)
Benin	Lagos—(Ereko St.)
Bukuru	Maiduguri
Calabar	Onitsha
Enugu	Oshogbo
Gunau	Port Harcourt
Ibadan	Sapele
Ikeja	Ilesha
Jos	Sokoto
Kaduna	Warri
Kano	Zaria
Kano—(Airport)	

MOROCCO - - -

Tangier

Agents in New York : THE STANDARD BANK OF SOUTH AFRICA LTD.

Every description of banking business undertaken

The Bank provides exceptional facilities for financing trade with West Africa

Principal Shareholders :

LLOYDS BANK LTD.
THE STANDARD BANK OF SOUTH AFRICA LTD.

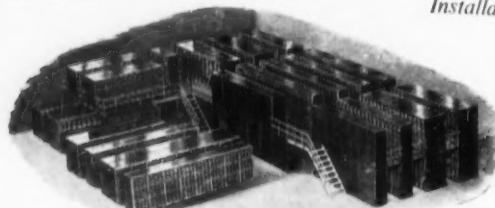
NATIONAL PROVINCIAL BANK LTD.
WESTMINSTER BANK LTD.

"SECO" ADJUSTABLE STEEL SHELVING

STORAGE EFFICIENCY !

FIRST-CLASS Storekeeping is induced by FIRST-CLASS facilities. Cut out those delays, shortages and losses caused by inadequate storage equipment. STANDARDISE YOUR STORES with 'SECO' Steel Shelving and Rack components—adjustable and interchangeable. We can advise you on housing your valuable stores by means of modern efficient and economical methods.

A Single Section or A Complete Tiered Storage Installation



Suitable for mining spares such as compressor, filter, pump, and engine parts; valves, cocks, couplings, packings and joints; bearings, belting, cables, tools, electric fittings, lamps and general engineering stores and materials—

ALL ACCOMMODATED IN 'SECO' SHELVING RACKS AND BINS
ALTERATIONS AND ADDITIONS EASILY MADE
ALSO : Clothes Lockers, Barrel Stands, Storage Racks, Shelving Boxes, Storage Bins, Bench Legs and Benches

THE STEEL EQUIPMENT CO. LTD.
GREGGS GREEN WEST BROMWICH
STAFFORDSHIRE ENGLAND

Phone: Tipton 2521-2-3-4-5 Grams: "Equipit," West Bromwich

L.O.B.



48, BURLINGTON ROAD, ISLEWORTH, MIDDLESEX

TRACTORS

International T.D.18 Tractor with Ruston P.24 power control unit. Good running order.

H.D.14 Allis Chalmers Tractor with Garwood double drum power control unit. In good order as lying.

MOBILE CRANES

NEAL "N" 20ft. jib pneumatic tyres, fully reconditioned. Lifts 2 tons at 8ft. 9in. radius, 1 ton at 14ft.

JONES "Super 40" 25ft. jib, solid tyres, reconditioned throughout. Lifts 3 tons at 9ft., 2 tons at 12ft.

Metal and Mineral Trades

Established 1797

Members of the London Metal Exchange

DERBY & CO., LTD.

11-12 ST. SWITHIN'S LANE, E.C.4.

Telephone: MINCING LANE 5272

Specialists in

**WOLFRAM, SCHEELITE, CHROME, MOLYBDENITE, TANTALITE, COLUMBITE
RUTILE, ILMENITE, BERYL, ZIRCON AND OTHER MINERALS**

Smelters and Refiners of

GOLD, SILVER, PLATINUM, PALLADIUM, OSMIUM, IRIDIUM, ETC.

Buyers of

**MINERALS, ORES, CONCENTRATES, SWEEPS, LEMELS AND RESIDUES
containing GOLD, SILVER, PLATINUM, COPPER, TIN, ZINC, LEAD**

Also at:

**NEW YORK :: ADELAIDE
JOHANNESBURG
SALISBURY (Rhodesia)**

Smelting and Refining Works:

BRIMSDOWN, MIDDLESEX

LEONARD COHEN LTD.

**GOLD, SILVER AND THE PLATINUM METALS
ORES, CONCENTRATES AND RESIDUES
METAL HARDENERS
NON-FERROUS METAL INGOTS**

London Office :
I HAY HILL, W.I
Telephone : GROSVENOR 6284

Works :
PORTH, GLAM
Telephone : PORTH 280

S. B. LUNZER & CO. LTD.

**NON-FERROUS SCRAP METALS
INGOTS, ORES AND RESIDUES**

Offices :
**WESTMINSTER BANK CHAMBERS,
LONDON BRIDGE, S.E.1**
Telephone : HOP 1071/2
Cables : LUNZMETAL, LONDON

EASTERN SMELTING CO. LTD.

CAPITAL—AUTHORISED £500,000: £435,000 ISSUED

Head Office : **ST. SWITHIN'S HOUSE, 11/12 ST. SWITHIN'S LANE, LONDON, E.C.4**
Telephone : MANsion House 2164/7
Telegrams : TIMAMASA, PHONE LONDON

TIN SMELTERS

BRANCHES THROUGHOUT THE FEDERATION OF MALAYA

Sole Selling Agents : **VIVIAN, YOUNGER & BOND, LIMITED, PRINCES HOUSE, 95 GRESHAM STREET, LONDON, E.C.2**
Telephone : MONARCH 7221/7
Telex : LONDON 8665
Telegrams : BOND, STOCK, LONDON
Cables : BOND, LONDON

we buy
**CONCENTRATES
ORES RESIDUES**
 containing
**Base and Precious
METALS**

E. M. JACOB & CO. LTD.

Members of the London Metal Exchange

GREENWICH HOUSE, 10-13 NEWGATE ST.,
LONDON, E.C.I

Telephone: CITY 8401 (7 lines) Cables: JACOMETA, LONDON
Telex No: LONDON 8655

Sme's 352

ROKKER & STANTON LTD.

DRAYTON HOUSE, GORDON STREET
LONDON, W.C.I

Metal Stockists & Shippers
for
**BRASS, COPPER, ALUMINIUM
AND NICKEL SILVER**

in
Sheets, Rods, Tubes, Strip, Wire, etc.

Associated Companies in Holland and Belgium
also Regd. in South Africa and Rhodesia

Tel: EUS 4751/2 Cables: BENTLY 2nd; A.B.C.6
Grams: ROKKER, WESTCENT, LONDON

MINING & CHEMICAL PRODUCTS, LTD.

86, STRAND, W.C.2

Telephone: Temple Bar 6511/3 Works: ALPERTON
Telegrams: "MINCHEPRO, LONDON" WEMBLEY, MIDDLESEX

Buyers of Silver Ores and Concentrates

Smelters and Refiners of
BISMUTH
ORES, RESIDUES & METAL

Manufacturers of:
FUSIBLE ALLOYS, SOLDER, WHITE METALS,
ANODES OF TIN, CADMIUM and ZINC IN
ALL SHAPES

Importers and Distributors of:
**ARSENIC . BISMUTH . CADMIUM
INDIUM . SELENIUM . TELLURIUM**

HARRIS PLASTICS (RICHMOND) LTD.

FOR ALL SCRAP METALS

Specialities:—

NICKEL MOLYBDENUM TUNGSTEN
MANOR PARK, RICHMOND, SURREY Phone: 0028

DEERING PRODUCTS LTD.

8 GREAT SMITH STREET, LONDON, S.W.1

**ORES - MINERALS - REFRactory
RAW MATERIALS**

Telephone: ABBEY 2681/2 Cables: PRODEERING, LONDON

GEORGE T. HOLLOWAY Co. LTD.

Metallurgists & Assayers

ORE TESTING, WORKS AND METALLURGICAL
RESEARCH LABORATORIES

**Atlas Road, Victoria Road, Acton,
LONDON, N.W.10**

Telephone :
ELGAR 5202

Grams and Cables :
NEOLITHIC LONDON

**THE STRAITS TRADING
COMPANY, LIMITED**

Head Office :
P.O. Box 700, OCEAN BUILDING, SINGAPORE

Works :
SINGAPORE & PENANG

"The Straits Trading Co., Ltd."
Brand of Straits Tin

**THE BRITISH TIN SMELTING
COMPANY, LIMITED**

Works : LITHERLAND, LIVERPOOL
Smelters of Non-ferrous Residues and Scrap

London Agents :
W. E. MOULDALE & CO., LTD.
2 Chantrey House, Eccleston Street, London, S.W.1
Cables : Wemoulanco, London Telephone : SLOane 7288/9

Contractors for Ores · Concentrates & Residues containing

LEAD
ZINC · COPPER · ANTIMONY · WOLFRAM

LEOPOLD LAZARUS LTD.
CREECHURCH HOUSE, LONDON, E.C.3
 Telephone: AVENUE 5341 Cables: ORMINLAZ, LONDON
 OFFICES AT SYDNEY, CALCUTTA AND JOHANNESBURG

CHARLES KERRIDGE

- SCRAP LEAD
- BATTERY PLATES
- COPPER CABLES
- NON-FERROUS CONTENTS
- NON-FERROUS CONTENTS

FENCEPIECE ROAD, CHIGWELL, ESSEX

Telephones : Hainault 2903, Larkswood 3863 Telegrams : Metallia East Phone London

J. LOWENSTEIN & CO. LTD.
GREENWICH HOUSE,
10/13 NEWGATE STREET, LONDON E.C.1
 Telephone : City 8401 (7 lines)

ORES - METALS - RESIDUES

H. BARNETT LTD.
 VICTOR ROAD, LONDON, N.7.
 IMPORT : EXPORT

Phone : ARCHWAY 5461 (5 lines) Established 1865
 WE SPECIALISE IN ALL NON-FERROUS
 SCRAP AND INGOT METALS

CUPELS

MAGNESIA CUPELS and ASSAY MATERIAL
 "MABOR" BRAND, as supplied to MINTS,
 MINES and ASSAYERS throughout the World.

MABOR (1944) LIMITED
 (Founded 1900)

THE PIONEERS OF MAGNESIA CUPELS
 Registered Office : 310 Winchester House, London, E.C.2
 Phone : London Wall 5089 Tel. Address : Maborlim, London
 Agencies : SALEM, INDIA ; MONTREAL, CANADA ;
 PERTH, W.A.

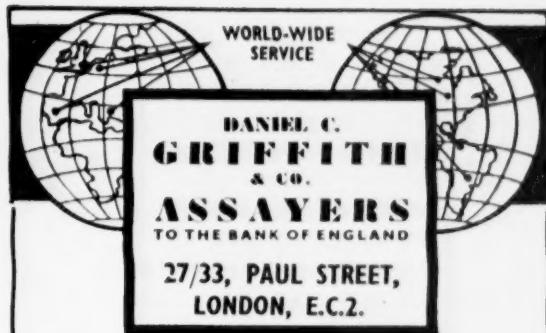
Supplies through Agents, the Trade, or direct.

TINPLATES - BLACKPLATES
Strips, Circles, Printers' Waste

EXPORT & HOME MARKET
 Prompt attention to all enquiries

BAYSWATER METAL SUPPLY CO.
 34, WOOD LANE,
 LONDON, W.12. ENGLAND

Phone: SHE 6429 Cables: ALMETSUP, LONDON



DANIEL C. GRIFFITH & CO.
ASSAYERS
 TO THE BANK OF ENGLAND

27/33, PAUL STREET,
 LONDON, E.C.2.

Branch Office : LEFKA, CYPRUS

Also at:
 BRISTOL
 BIRMINGHAM
 GLASGOW
 HULL
 LIVERPOOL
 NEWCASTLE
 S. WALES

Analytical Chemists, Samplers,
 Technical representatives in
 sales of Ores & Metals at all
 Ports and Works.

Analyses of
PRECIOUS METALS
BASE METALS
ORES & RESIDUES
 Etc.

Telephone : MONARCH 1314 (3 lines)

Also in:
 BELGIUM
 CANADA
 FRANCE
 GERMANY
 HOLLAND
 ITALY
 PORTUGAL
 SPAIN
 SWEDEN
 SWITZERLAND
 U.S.A.

Telegraphic Address : "GRYFFYDD, LONDON."

HENEAGE METALS
for Quality Ingots IN BRASS, GUN METAL
 & PHOSPHOR BRONZE.

PHONE ASTON CROSS 1177/8
 HENEAGE METALS LTD., HENEAGE ST., BIRMINGHAM.

For buying or selling
METALS,
METAL SCRAPS,
MINERALS and ORES

Contact . . .

K. PRABHAKAR
 METALS AND ORES BROKER
 P.O. Box 1504, MADRAS-I, INDIA

Cables : KURMAS Phone : 4184 p.p.

ENTORES, LIMITED
 KINGS HOUSE, 36 & 37 KING STREET,
 LONDON, E.C.2.

NON-FERROUS METALS
ORES · RESIDUES

Telegrams : Entores, Phone, London	Telephone : MONArch 3415	Telex No : London 2-2489
------------------------------------	--------------------------	--------------------------

ZINC SHAVINGS GRANULATED & POWDERED NON-FERROUS METALS

"Lead Wool" for Pipe-jointing,
Metallic Packing for Pumps, etc.

THE LEAD WOOL CO., LTD.
SNODLAND KENT

Telephone : Snodland 84216 & 7 Telegrams : "Strength, Phone, Snodland"

International Smelters and Buyers of

NON-FERROUS SCRAP METALS AND RESIDUES

TIN
LEAD
WHITEMETAL
SOLDER
GUNMETAL
COPPER

THE EYRE SMELTING CO LTD

Tandem Works, Merton Abbey, London, S.W.19

Phone : Mitcham 2031

Wire : Eyrsmeltin, Phone, London

MAYBANK METALS LTD.

This Company backed with the vast experience gained in a 100 YEARS of progressive trading, will expedite all orders . . .

THE BUYING OF MIXED OR SORTED NON-FERROUS SCRAP METALS and Supplying of Finely Graded Non-Ferrous Scrap to Your Requirements.

MAYBANK METALS LTD.

DEPTFORD WHARF, GREENWICH HIGH ROAD,
LONDON, S.E.10. Telephone : TIDeway 5351
(10 lines)

EVERITT & Co. LTD.

Teleg. Address: Persistent, Liverpool

40 CHAPEL STREET
LIVERPOOL

Phone : 2995 Central

SPECIALITY

MANGANESE PEROXIDE ORES,

We are buyers of :—
WOLFRAM, SCHEELITE, MOLYBDENITE
VANADIUM, ILMENITE, RUTILE,
ZIRCONIUM and TANTALITE ORES

Suppliers of :—
FERRO-ALLOYS & METALS NON-FERROUS ALLOYS

RHODESIA CHROME MINES LTD



THE AFRICAN CHROME MINES LTD

*Metallurgical
Refractory and
Chemical Grades
of Chrome Ore*

Enquiries to :

Head Office : 103 · MOUNT STREET · LONDON · W.1.

Telephone: HYDE PARK 9951. Telegrams: ORECOS, AUDLEY, LONDON

**always
in
the market . . .**

**Smelters and Refiners
of Non-ferrous Metals
for over 100 years.**

**Always in
the market—both as
buyers and sellers.**

**Members of the
London Metal Exchange.**



selling

antimonial lead alloys for the battery trade . . .
cable alloys to all specifications . . .
refined soft pig lead . . .
lead for equipment in radioactive work . . .
lead and tin powders . . .
SOLDERS—Ingot, stick, solid and cored wire, washers,
preforms, etc. . . .
Fluxes and solder paint . . .

BUYERS FROM ENTHOVEN can rely on obtaining
products to exact specifications processed under strict
laboratory control.

buying

battery plates . . .
lead drosses and skimmings . . .
lead concentrates . . .
scrap and remelted lead . . .
scrap solder and white metals . . .
scrap type metal . . .
scrap tin . . .
residues . . .

SELLERS TO ENTHOVEN can rely on a ready
acceptance of material—whatever the state of the market.

H. J. ENTHOVEN & SONS LTD.

Head Office
Enthoven House, 89, Upper Thames Street, London, E.C.4.
Telephone: MANSion House 4533.
Telegrams: Enthoven Phone London.

SMELTERS AT ROTHERHITHE, LONDON, AND DARLEY DALE, DERBYSHIRE

Huwood



The large trunk conveyor shown above illustrates both good theory and good practice. It is built up of open structure to facilitate inspection. The structure is raised to keep the return belt clear of the floor. It is fitted throughout with Huwood Oil-filled Idler Rollers, and all belt joints are vulcanized. The conveyor is approximately 1400 yards long, is driven by a 60 h.p. G.T.B. Drive Head, the belt being 42 inches in width.

This conveyor has now carried nearly two million tons and is still in excellent condition.

HEAD OFFICE & FACTORIES :
Telegrams : HUWOOD, GATESHEAD.

HUGH WOOD & CO., LTD., GATESHEAD - ON - TYNE, 11.
Telephone : LOW FELL 76083 (5 lines).

Industrial and Export Office :
Telegrams : HUWOOD AVE, LONDON.

DASHWOOD HOUSE, 69 OLD BROAD STREET, LONDON, E.C.2.
Telephone : LONdon Wall 6631-2-3.